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SCIENCE & TECHNOLOGY

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Qian Xuesen on Preparing S&T Establishment for Challenges of 21st Century

40081006a Beijing XIANDAIHUA [MODERNIZATION] in Chinese No 9 Sep 88 p 4-5

[Article by Qian Xuesen]

[Excerpts] When we look at the prospects for S&T development in the Twenty-First Century, we must start from the historical fact that China is still in the initial stages of Socialism, then determine how to adapt the work of the China Association of Science and Technology to the changing era. China is currently in an historical advancement process of profound reform and opening up. The gradual establishment of a new order based on a commodity economy is the major subject of our time. The work of our Association must blend into this overall topic. We must persistently gear ourselves toward modernization, the world and the future. As a unified society with many scholars and specialists in the natural sciences, technical sciences and intersecting fields from all over the country, a great deal of our work should be on the leading edge. Especially as regards academic study of future development, we should provide thoughtful, valuable views on policy-making questions. What should the Association be considering now as we face a new era with the turn of the century.

We should lose no opportunity to advance reform of the Association. China is in a critical period of reform, and the comprehensive launching and thorough development of economic and political reform nationwide is providing excellent conditions for reform of the Association. Based on a spirit of independent action and initiative, the relationship between all components must be well ordered and the problems of establishing organizational systems and work mechanisms must be solved, thus enabling all levels of organizations, academic groups, and groups for the dissemination of science within the association to become mass S&T groups adapted to the demands of major forms of future development in S&T, permeated with the vitality of the age and possessing the special qualities of China.

We must exert maximum effort in the service of promoting advancement. Those S&T workers in China who have a sense of responsibility to the age and a sense of the urgency, should seize the opportunity to do their utmost to catch up, to close the gap in S&T between the developed countries and China. All levels of organizations and academic groups within the Association should take the energetic advancement of academic exchange as their own important duty. Thought must be further stimulated and exchange flow must be further facilitated. We must uphold and carry forward the democratic spirit of S&T work and further develop academic freedom and technological democracy. Academic discussion of

scientific thought and methods must be emphasized. In order to promote practical development of S&T, theoretical research into the regulation, methods, strategy, points of emphasis, principles and policy of S&T development should be improved.

We should place even greater emphasis on the work of S&T dissemination, elevating it to a strategic position in the development of national modernization. The goal of national modernization should not only be the elimination of illiteracy, but also the elimination of scientific illiteracy. Moreover, this work should be well integrated with the establishment of a culture characterized by the spirit of socialism. The dissemination of science is a basic task in the construction of a civilized country and society. The Association, along with its affiliated academic and science dissemination groups, should cooperate with relevant national departments to formulate as soon as possible a national strategic plan for the dissemination of science and in practice, bring into play a positive promotional role.

We should advance the integration of S&T, the economy and culture to an even greater degree. The primary mission of S&T work is vigorous development of the National Economy. The "Stress the Ideal and Compete in Contribution" competition that has been begun among industrial S&T workers is a good way to promote S&T integration with the economy. It must be continued. The inception of the Rural Technology Research Association and the Technology Association must be furthered and consolidated, as they are forming important routes along which modern technology can move into the countryside. With the deepening of the reform, the cultural consciousness of business and the cultural quality of workers will become more and more of a restricting factor on economic development. An important aspect of increasing economic returns from business and avoiding pursuit of one-sided, short-term economic behavior is overcoming a tendency, already apparent, to overemphasize economics and underemphasize culture. From the view of long-term economic construction, this also has great significance.

We should work hard to promote the growth of talented S&T personnel. The worldwide competition of this age, in economics and S&T, is concentrated in the competition for talented people. Hope rests in the youth. The training of talented people to face the Twenty-First Century must begin with today's youth. We must support and cooperate with education departments in working hard to develop S&T activities for youth, thus facilitating the constant growth of the seeds of talented S&T personnel. We must fully bring into play the functions of the S&T Association and scholarly societies in promoting the growth of skilled personnel and in social education. Also, the display of talent by those youth with creative ability, in all fields of study, must be encouraged. We must promote increased esteem for knowledge and skilled personnel from all quarters of society. The work of educating and training skilled personnel should be held in even higher esteem. In this way we can pour our energies into forming long-term establishment of S&T teams characterized by rational structure, complete curriculum and mass participation.

We should work hard to advance the alliance of natural science and social science. Modern science is unified. Research into the intrinsic principles and extrinsic conditions of natural science becomes involved in the area of

philosophical social science. When, in this age, the philosophy of social science departs from its foundation in the natural sciences, it becomes impossible to form ideas applicable to the demands of catching up with modern developments. Workers in the natural sciences should acquire necessary knowledge in the philosophy of social science, becoming a group promoting the union of these two fields.

Problems Hamper Realization of 'Torch Plan' Goals

40081006b Beijing XIANDAIHUA [MODERNIZATION] in Chinese No 9 Sep 88 p 10

[Text] In China's "Torch Plan", 100,000 S&T personnel will be mobilized in a coastal economic development strategy to set up new, high-tech industries. This provides yet another arena in which a large number of S&T personnel can bring into play their intelligence and abilities.

Since the seventies, following the lead of micro-electronic technology, the fields of information technology, biotechnology, new materials, new energy sources, and other fields of high technology have developed explosively. The developed countries and some newly industrialized regions, have, one after another, adjusted their industrial structures and set up new, high-tech industries in such areas as electromechanics, photo-electronics, office automation equipment, information management, and modern biological products. In comparison with traditional industries, these new fields which possess funding, technology, concentrations of intellectual ability, high value added products and other special characteristics, offer enormous profit to some businesses and countries, allowing them to increase their competitiveness and economic power. This trend in world economic development provides both challenge and opportunity for China. The Central Government has organized domestic specialists to study ways of dealing with this situation. The conclusion is that the opportunity must be seized and the challenge met, otherwise China may be forced out of the competition. At the beginning of the year, comrade Zhao Ziyang pointed out that we must work hard to develop high-tech industries and that this is an important aspect of China's coastal economic development strategy.

The situation is compelling us to take action. Given this, does China now possess the basic conditions for development of new high-tech industries? The answer is a positive one. In the 40 years since the establishment of the PRC, the country has achieved attention-getting accomplishments in such fields as spaceflight, the nuclear industry, computers, biotechnology, lasers, electromechanical integration, new materials, and other high-tech areas, some of which are in the forefront worldwide. At the same time, we have trained a superior S&T group, numbering about 1 million members. They have creative spirit, strong ability to develop products, and are rich in practical experience. This is our undisputable advantage in S&T. It is enough to evoke the envy of some countries and regions.

However, the actual situation is that these advantages have not functioned as they should in the development of China's economy. Although we have made great accomplishments in high-tech, because of separate S&T and economic systems these accomplishments have not become products. To an even lesser extent have they reached commercialization on a scale appropriate to entry into the domestic or international markets. A survey of the S&T group by relevant departments indicates that within China's S&T institutions, high-level research colleges, universities, and mid-to-large-sized enterprises, approximately 1 million S&T personnel are engaged in technical and developmental research. About 100,000 are engaged in basic research, basic applications research and research on high-tech items. Of the remaining personnel, one-third basically are not utilized. It is apparent from this, that China still has enormous potential for the development of new, high-tech industries. Creation of a good environment, including formulation of necessary policy and programs, the opening of channels for funding, the establishment of support services, etc, is requisite to the future development of new, high-tech industries.

The State S&T Commission has formulated the "Torch Plan", an important component of new, high-technology industries. One of its objectives is the facilitation of high-tech accomplishment commercialization and the creation of excellent conditions for the market entry of accomplishments resulting from the high-tech research development plan and the Seventh Five-Year Plan's program for resolving key problems in S&T. The Science Association of China and its member societies should act as fuel in the "Torch Plan" implementation process, allowing scientists and technical specialists to fully exploit the conditions created by the "Torch Plan" to actively and promptly put forward their own new accomplishments. Thus, they contribute their own capabilities to the development of new technology, new technological products and new, high-tech industries.

But we must understand that the road ahead is fraught with difficulties. For example, serious funding deficiency exists; a commodity economy has only just been developed, market and competitive mechanisms are still far from perfected; a large group of business people with understanding of technology, with management ability and with international market familiarity is needed; the quality of personnel and the level of management await improvement; experience in international markets is lacking, etc. All of these problems await our profound reform of S&T and economic systems, formulation of appropriate policy and regulation, training of skilled personnel, establishment of support systems for S&T enterprises, etc, for solution. This is to say that we must provide protective policies for S&T personnel entering high-tech industries and create for them an excellent social environment.

We believe that through fully bringing into play China's S&T advantages, China certainly can ignite the brilliant torch of new, high technology industries.

Speeding Up China's Technological Modernization

40080076a Hong Kong LIAOWANG OVERSEAS EDITION in Chinese No 50, 12 Dec 88 pp 6-9

[Article by Yi Yao (2496 2641)]

[Text] After a long period of hesitation, China is finally ready to take off on a new start and with a new look.

At the 1978 National Science Congress, China set forth its policy of "orienting science and technology toward the economy", thereby placing China's science and technology in a new historical era. During the last 10 years, the development of China's science and technology has not only speeded up changes in the way of production and livelihood in Chinese society but also changed China's economic and social structure as well as its scientific and technological undertakings.

The total number of natural scientists and technicians in China is now more than 8.7 million. This is more than double the figure in 1978. After implementing the system for appointing personnel with professional skills, there are now nearly 600,000 specialists holding positions in the field of high technology.

With the establishment of the new strategy for science and technology, and the reform of their administrative structure, the awareness and enthusiasm of China's scientific and technological circle to serve economic construction have been greatly enhanced. In the realms of industry, agriculture, national defense, and new technology, a number of fairly high standard achievements have been attained, bringing in considerable economic returns during their actual application. During the last 10 years, more than 60,000 major scientific and technological successes were achieved throughout the nation. This figure was more than double that of the achievements scored during the previous 30-odd years. A considerable number of these achievements have reached internationally advanced standards. Upon dissemination and application, the total value of newly increased production so far from some 4,000 achievements which have won commendations at the national level has amounted to more than 140 billion yuan.

The pace that China's science and technology has moved into the international market has been accelerating. Between 1978 and 1986, more than 60 technological projects, with a value of more than 66 million dollars, were exported. Between 1987 and the first half of 1988, the number of projects exported rose sharply to more than 200, and their value was worth more than 240 million dollars. In the past 10 years, China has participated in 15 international technology fairs and expositions, exhibiting more than 1,000 items

and winning nearly 300 awards. China has also successfully held technology fairs for foreign clients to open up new channels for technology exports.

The recognition in China that science and technology are productive forces has epoch-making significance for China's scientific and technological circles. Scientists and technicians have become a part of the working class. This has not only smashed the trammels of the old system, but also the spiritual shackles that held back millions of scientists and technicians, enabling them to release enormous energy in their new positions for China's scientific and technological undertakings. Nearly 400,000 scientists and technicians have left research organizations, institutions of higher learning and other organs by means of transfer, resignation, or leave without pay for the frontline of production to provide technical services, and pursue technical and economic contracting. They have also set up and taken over the management of rural enterprises as well as medium and small enterprises under various forms of ownership. At least 800,000 personnel are engaged in various forms of technical development and consultation on a part-time basis. The spread of this talent and knowledge has directly and indirectly created an enormous amount of wealth in society.

A group of mainstay research organizations and institutions of higher learning which dominate science and technology have entered the economic field directly through various methods, providing rich experience on the integration of science and technology with the economy. The number of organizations that have combined research and production has exceeded 10,000. More than 100 independent research organizations under the jurisdiction of the central authority, provinces, and municipalities have linked up with enterprises or enterprise groups. A greater number of research organizations have taken over the management of economic entities, and taken the lead in organizing guiding enterprise groups, conglomerates, and joint ventures, forming export-oriented entities of considerable size. In recent years, nearly 7,000 personnel have left the Chinese Academy of Sciences and set up nearly 400 corporations. They have moved towards the road of becoming high technology enterprises in which research, development, and marketing are integrated. They have used science and technology as a backup, the market as a guide, and the product as the lead. In 1987 the total value of technology and products exported by the academy exceeded 10 million U.S. dollars.

Technological development has become a relatively independent system. Various studies show that China's research organizations are beginning to move away from simply doing research to engaging in both research and management.

China has been taking various steps to ensure that economic construction depends on scientific and technological progress, and that science and technology consciously regard serving economic construction as their main task. Whether such steps are favorable to the advancement of science and technology and the expansion of productive forces has become the criterion for weighing advantages and disadvantages, distinguishing right from wrong, and examining one's work.

Bringing About Commercialization of Technology

The Commercialization of technology, and the transfer of scientific and technological achievements in return for payment, have been important turns in China's development of science and technology. These changes have put an end to the 30 years of uncompensated transfer, and have had a decisive bearing on channeling China's science and technology to meet the needs of modernization, and their adaption to world trends. The emerging of the technology market has finally enabled the Chinese people to have a more accurate understanding and evaluation of the status and value of scientific and technological work.

Scientific and technological achievements, as they enter the market as a commodity, speed up their own materialization and enhance their own value. They also introduce competition into the operation of the scientific and technological system by correcting the market, breaking the tedium of dissemination of scientific and technological achievements by administrative means, and enabling topics, dissemination, and application to be determined by the needs of society, thereby increasing their application. Science and technology grew out of the actual economic situation and have gradually become a link within the supply and demand mechanism.

Technology as a commodity has spread extensively into every field of economic and social development. For several years in a row, the total value of contracted transactions in the technology market has increased by an average annual rate of 60 percent. In 1987 it attained the highest value of 3.35 billion yuan. It reached 2.21 billion yuan in the first half of 1988.

In China, the technology market has become a bond linking science and technology with the economy, and a bridge transforming scientific and technological achievements into productive forces. The technology market network is getting bigger and bigger, the methods of transaction conducted by technical service organizations have become more flexible, and the quality of technology has continued to improve. There are more than 5,000 technical trade business organizations at and above the county level throughout the nation, forming a multilevel, multichannel, and multiform infrastructure for disseminating scientific and technological achievements and continuously raising their application rate. The average application rate in 1978 was around 25 percent; in 1988, based on a survey of nearly 100,000 achievements during the sixth 5-year Plan, it exceeds 70 percent. The 1978 National Science Congress commended some 7,750 achievements attained since the founding of the People's Republic. Ten years later, based on incomplete statistics, the number of achievements registered at and above the provincial and ministerial level was about 200,000, with more than 82,000 of them winning awards at the corresponding level. According to surveys by some provinces and municipalities, the proportion of input for the dissemination of these achievements, the value of newly increased production, and the profit and tax they yield is roughly 1:10:2. In the case of hybrid rice alone, within 10 years, it has been planted on 160 million mu, increased production by about 50 billion kilograms, and yielded economic returns of 5 billion yuan.

The commercialization of technology as an objective requirement for developing commodity production is one of the most active aspects of China's economic life. As a natural outcome of socialization, science and technology have also become more active. According to studies and statistics of 55 development and research projects, the annual net income received from the technology market is 340 million yuan, equivalent to more than 110 percent of the appropriations made for these projects. According to statistics concerning the value of transactions in the technology market in 1987, technological products provided by research organizations and higher institutions of learning throughout the nation made up more than 42 percent of the transaction value. Shenyang, which set up the first technology market, has made more than 2,500 scientific and technological achievements of considerable merit in the past 3 years. Among them, more than 20 appeared internationally for the first time, at least 180 of them attained international standards, and over 70 received scientific and technological advancement and invention awards from the state.

The structure of technological production, its direction, and volume affect the macroeconomic structure, the level of social productive forces, and the overall national economy.

Stimulating China's Industrial Vigor

China has made tremendous achievements in industrial production in the past decade. However, we were able to maintain our level of industrial development only with three times more energy and raw materials than the developed nations. At the same time, we had to pay a price for maintaining our high industrial output by sacrificing our environment. One of the main reasons for all this is that over a protracted period, China has been traveling on the path of "doing higher-level scientific research, and promoting lower-level technology." Relevant statistics show that as of the early 1980's, only 30 percent of the 6,500 large and medium-sized enterprises in China had their own departments for design and technical development. At least 20 percent of the enterprises neither had the funds nor the necessary manpower for technical development.

The major task in developing science and technology in China during the past decade was to import and assimilate advanced foreign technology in view of the vast technologies we need for developing our national economy; to promote our work in the field of science and technology at home; and to improve China's technology structure by means of imported technology. In carrying out scientific research, China is changing its practice of trying to develop everything by itself and manufacture everything in China. It is shifting its focus of technical development and applied research work to importing and assimilating foreign technology and to promoting creativeness in the field of science and technology.

Over the past decade, China imported more than 80,000 devices for technical transformation, and signed more than 30,000 contracts worth over \$13 billion. Over 10,000 projects have already been completed. Each year, these projects increase the nation's production value by 61 billion yuan, yield over 14

billion yuan of taxes and profits for the state treasury, and earn more than \$1.7 billion of foreign exchange for the state. During the Sixth 5-year Plan, about 60 percent of China's newly increased industrial output was due to technical progress and improved management. China has not only soberly realized the gap between China and the developed countries, but also found the actual causes of this gap. The developed countries attribute about 60 percent of their economic growth to progress in science and technology, while China at present can attribute only 30 percent of its economic growth to progress in science and technology.

China's traditional products account for more than 70 percent of its industrial and agricultural gross output, 64 percent of its export goods output, and 85 percent of its state revenues. For well into the future, China's traditional industries will remain the basic foundation for its social and economic development. Over the past decade, efforts in the fields of science and technology were the result of the new industrial revolution. In the course of developing production, it has changed outmoded technologies to new technologies, and filled them with vitality. The large-scale import of technologies and technical transformation have rapidly improved the quality of China's industries. According to incomplete statistics, nearly 2,000 new industrial products have been developed as of the first half of 1988. Thirty-five percent of these new products are of world advanced standards; 65 percent of them fill gaps in the fields of science and technology in China; and 85 percent are of the domestic advanced level. At the same time, more than 8,000 new industrial products have been developed, thanks to the efforts made by local enterprises in technological development.

The spirit of "self-reliance" in the development of science and technology in China is aimed at importing, absorbing, and assimilating science and technology from abroad and creating new fields. It has helped the Chinese giant to emerge from its closed doors and see its own future.

Another extremely prosperous market for the development of China's science and technology is the its vast rural area which is taking the road of industrialization for commodity production. The "spark plan," the "bumper harvest plan," and the various plans for scientific and technological development in all localities are changing outmoded forms of production and livelihood based on the natural economy. The rapidly developing rural enterprises are imbued with vitality. They are assimilating a large amount of scientific and technical knowledge and becoming important base areas for putting the results of scientific research work to use. By relying on scientific and technical progress, many rural enterprises have grown strong and become the "unoccupied half of the country." At least 100,000 scientists and technicians are working harder than ever before in this vast land with its great latent potential. While strengthening the technical foundation of rural enterprises, they have built a bridge for the transfer of technology from the cities to the countryside.

In the course of improving rural enterprises, science and technology have led to more competition, while competition has served the needs of science and technology. A new theme facing rural enterprises is how to keep pace with the constantly changing economic environment and how to help develop the state strategy for national development. The multichannel and multilayer network offering scientific and technological services has presented rural enterprises with new options and opportunities. Now, most of the rural enterprises are labor intensive, with only a handful of enterprises possessing high technology. An encouraging trend is that rural enterprises, with their achievements in science and technology, are knocking on the world's doors. A number of "spark" and "torch" technology-intensive districts have used their advanced technology to successfully develop readily marketable products for the world market. A considerably large number of rural enterprises have resolutely used their knowledge of science and technology to shift their focus from the domestic to the export market. This trend has presented science and technology in China with a new task which should not be ignored.

According to the grand plan for modernization, the general goal of China's economic development is to march toward a mature industrialized society. In meeting this general goal, the strategy for China's scientific and technological development is to develop a compound-type technology by combining traditional technology with newly emerging technology. In addition, new technology and hi-tech should transform the existing trades and enterprises so that they can more rapidly shift onto the orbit of modern technology and modern management. Personnel in the scientific and technological field are studying the use of electronic information technology to transform energy resources, transportation, and telecommunications, the use of mechanical electronic technology to transform the manufacturing industry, the use of biotechnology to raise the level of agricultural, food, and drug production, the development of high-tech materials, including the development of new materials for practical use, and the transformation of the machine-building, energy, electronic, communications, and other industries.

Toward the New Century

China's scientific and technological development is based on two basic presuppositions: First, China has built an industrial foundation of considerable scale, but the task of industrialization remains unfulfilled. Traditional technology and industry need to be developed greatly. Second, the emergence of the new technological revolution in the world will tremendously influence China's development. This revolution offers us an opportunity to directly make use of the world's new scientific and technological achievements, leap over certain stages, and quicken the pace of modernization and presents us with a sobering challenge.

Accepting the challenge of the new technological revolution is the historical mission of China's science and technology. Correctly selecting those sectors which should be developed on a priority basis and handling the relationship between traditional technology and hi-tech are the strategic tasks China's science and technology are faced with.

When China made up its mind to quadruple its gross industrial and agricultural output value by the end of this century, many countries were trying to win a favorable strategic position for the 21st century. Hi-tech has become the "commanding point" in economic competition and a major factor which determines triumph or defeat in the competition of national strength among all countries.

Facing this fight, China's scientific and technological circles remained silent for a long time. Obviously, it was unwise to take the developed countries' old path to industrialization. China must raise the level of technological development of its overall economy, increase the proportion of hi-tech industry in the industrial structure, and develop a hi-tech economy.

China quietly made its move in 1986. The Expert Committee took charge of implementing the national hi-tech research and development program, which called for thorough planning in seven major fields of science and technology, namely, biology, astronautics, information, automation, lasers, energy, and new materials. The entire program generated more than 1,500 research projects. The "spark plan," which served to pave the way for turning hi-tech research achievements into commodities, was launched 2 years later. More than 8,000 scientists and technicians were engaged in this development program, working at three levels, namely, hi-tech research, commodity development, and application and popularization. Beijing took the lead by putting a hi-tech experimental zone to work. According to the established plan, in 3 years' time, the zone would set up 500 hi-tech enterprises, turn out 500 hi-tech products, and yield an output value of more than 5 billion yuan. Wuhan and Shanghai also scored initial results. Nanjing, Tianjin, Shenyang, Lanzhou, and other major cities have established or are planning to establish high-tech and modern technology parks, to speed up the application and development of achievements at different stages by exploiting their own research and technical forces.

Doing research on and developing high technology, and establishing and expanding modern and high technology industries, are now considered important tasks for invigorating the economy. Although the overall productive forces of society are still backward, and a system of new and coordinated industries could not be established within the short time available, we have full confidence in the huge technical market that has already taken shape, the scientific and technological achievements which are finding wider applications, as well as the production departments with their regional advantages and technical superiority. Most important of all, China has more than 200,000 hi-tech development and research personnel.

China will gradually develop a complex technology network that will ensure common progress of traditional and high technologies, close coordination of imported and domestic technologies, and coexistence of technologies at different levels. The electronics and information industries have been tapped to take the lead in this century. They are the most effective for penetrating and influencing the economy and society, are fairly well-developed, and have gradually formed an echelon of technicians in keeping with the strategic emphasis of economic development.

Preserving "Staying Power" for the Future

On the whole, the essential setup of China's science and technology, which has basically developed as it moves toward the 21st century, is divided into three levels: The first level is designed to directly serve the strategic goal of quadrupling total industrial and agricultural output value; the second level, which consists of research in high and newly developed technologies as well as exploratory research, is designed to create a great impact on economic development by the end of this century, and to create the necessary conditions and make technological preparations for promoting China's economic development at a higher level; and the third level consists of research in basic science and basic applications.

Compared with the research in applied science and the development of technology, China's progress in basic research has attracted greater attention from the world's science and technology community. Achievements at the international level have been made in high-temperature superconductivity, nonlinear optical crystals, regeneration of seedlings from corn protoplasts, rare earth permanent magnetic materials, and other areas. New achievements, such as the successful operation of the Beijing Electron Positron Collider, the construction of a telescope for observing the solar magnetic field, the trial production of a scanning tunnel microscope, and the establishment and operation of other important laboratories, are of far-reaching significance in supporting the development of the national economy, science, and technology. In the past 40 years or so, China on several occasions wavered in its policy on basic research before it realized that basic research is the motive force, the soil that nurtures new technology, as well as the "staying power" for China's scientific and technological development. Without this "staying power," it would be impossible to guarantee China's sustained and steady social and economic development in the future.

China's primary task is to invigorate the national economy. The emphasis of scientific research development should be on keeping pace with the development of production. The scale of scientific research should match our nation's capabilities. However, China is trying to accomplish modernization in a situation where the world's economy is developing rapidly, and where competition is getting tougher. In order to stand on our own feet in the community of nations, we should keep track of and assimilate the latest scientific achievements and thinking of the world, strive to develop our creativity, and keep pace with the world's scientific community.

For historical reasons, China has been destined to fight on two fronts in science and technology. It must strive to achieve industrialization based on science and technology while maintaining and training a contingent of forces in basic research to fight in the forefront of contemporary science.

The Outline for the Development of Basic Research, which is being formulated, will determine the appropriate proportions for basic research, research in applied fields, and exploratory work. This will help promote the development of basic research and shorten the time required for turning scientific and

technological achievements into productive forces, thereby creating a sound cycle in which basic research promotes social and economic development, and economic growth supports the development of basic research.

China is deciding on its projects for basic research in light of its own national conditions. It focuses its selection on those fields which are rapidly gaining international popularity, and which may find important applications in the future, particularly those fields which are developing rapidly, require less investment, match China's natural characteristics, and can bring out China's superiority in resources. Research on some exploratory subjects, which demonstrate new academic thinking and are of relative high quality, is being undertaken.

Problems in, Changes for Highland Medical Research Addressed

40081014a Beijing GUANGMING RIBAO [GUANGMING DAILY] in Chinese 12 Oct 88 p 2

[Text] The Highland Medical Society of the Chinese Medical Society recently convened the first national highland medical science conference since the establishment of this society. Specialists from Beijing, Shanghai, Tianjin, Xi'an, Chengdu, Lasha, Nanjing, Kunming, Lanzhou and all parts of Qinghai read papers at the conference. Judging from the reactions of the conference, highland medical research in China has made some achievements in the 30-year period since its inception during the 50's. However, in general, development has been relatively sluggish, basic research has been relatively poor and research appears fragmented, lacking an overall comprehensive program. This is not suitable for one of the major highland countries of the world such as China. The situation is in urgent need of change.

The highlands of China are vast. The largest and highest is the Qingzang Plateau covering 2.3 million square kilometers, occupying about one-quarter of China's total area. The highlands are the center of China's livestock industry and they are rich in mineral and energy resources. However, factors such as decreased oxygen supply, low air pressure, low temperatures, low humidity and intense ultraviolet radiation create a series of disadvantageous effects upon the people's lives, health and labor productivity. This directly obstructs development and construction in the highlands. Improving research into highlands medicine, solution of problems of adaptability to the highland environment and protection of labor productivity in the highlands are of major significance to the four modernizations and to stability in the minority nationality regions. Development of the highlands is simpler than development of space in terms of resources and technology and is more economically worthwhile. China has approximately 3,200 kilometers of national defense lines located in highland areas. Strengthening highland medical research is also critically important to defense of the frontier regions and the consolidation of national defense. Highland medicine is an integrated discipline, an important branch of environmental medicine closely related to oxygen starvation, freezing and exposure. At the same time, there are close links to psychology, anthropology, and ethnology. Therefore, the range of disciplines included in highland medicine is very wide and those subjects involved are extremely complex. The central topic of highland medicine is solution of oxygen starvation problems. According to the measurements of foreign specialists, oxygen starvation of people at the

summits of the Himalayan mountains is about equal to that of those on the verge of death from heart and lung disease. Many aspects of aviation, space-flight, deep sea diving, the mining industry, tunnel projects, physical exercise and human disease are involved with the problem of oxygen starvation. Therefore, research into highland medicine is sure to widen the scope of the entire medical field and other disciplines, deepen the content of its research and promote its development.

China is well endowed by nature for the development of highland medical research. Not only does China have a high, large highlands environment unmatched in any other country, rendering unnecessary huge expenditures for construction of artificial laboratories to simulate highland localities, but also it has the Tibetan nationality which has passed through approximately 50,000 years of generational selection and is recognized worldwide as the group best adapted to the highlands. Apart from this are the other nationalities which have migrated into the highlands and lived there for varying periods, some hundreds of years and some only for a few. A natural experimental location is provided for research into the effects of different elevations, identical elevation at different latitudes and different microclimates on lifelong residents, migrants entering during different periods and those best adapted to high altitudes, and for research on those afflicted with all kinds of chronic and acute highlands diseases as well as multi-level contrasting anatomy research. In addition, there are animals native to the Qingzang Plateau which have undergone thousands of years of natural selection, such as yaks, the tibetan sheep, rodents and hares. These provide valuable requirements to researching human problems in adapting to the highlands from the viewpoint of comparative biology. China's highlands medical research should rank among the world's best.

The major reason for China's relative backwardness in highlands medical research is that this research is not sufficiently emphasized. It has not been included in national science planning. This research is only carried out in piecemeal, disjointed fashion by each concerned region and department. For this reason the advantages of the socialist system cannot be brought into play and a branch of significant capability cannot be formed. Therefore, those professors, researchers and other specialists attending the meeting strongly called for the following: 1) Immediately carry out preparations to include highlands medical research in the state's "Eighth 5-Year Plan" scientific research program. 2) Prepare for the establishment of a China Highland Medical Research Institute to constitute the core strength of the country in relevant research. The country can not only carry out research into salt lake and other mineral and biological resources while neglecting research into the protection of labor productivity. 3) In order to promote highlands medical research work, preparations should be made for a "China Highland Medical Journal." 4) During the period of the "Seventh 5-Year Plan" substantial support should be provided to decentralized, local highland medical research within the range permitted by state manpower, financial and material resources.

Lanzhou Completes Nation's Largest Heavy-Ion Accelerator

40080071a Lanzhou Gansu Provincial Service in Mandarin 0000 GMT 14 Dec 88

[Excerpts] The construction of a heavy-ion accelerator, so far the largest of its kind in China, was completed at the Modern Physics Research Institute of the Chinese Academy of Sciences in Lanzhou early in the morning of 12 December. This is another major achievement by China in the field of high technology after the building of an electron-positron collider in Beijing.

The inauguration of this heavy-ion accelerator in Lanzhou not only provides Chinese scientists with an important means of experiment for studies in heavy-ion physics and the application of heavy-ion beams, but also signifies that China has attained a world advanced standard in the field of development of large-sized cyclotrons.

The Lanzhou heavy-ion accelerator was designed and built by the Modern Physics Research Institute of the Chinese Academy of Sciences on its own. [passage omitted] The competent state organization, the Chinese Academy of Sciences, and the Gansu Provincial party committee and Government have shown concern for the project and have given support to the institute throughout the construction of the project. More than 100 units have made valuable contributions to the development of the accelerator.

A national laboratory will be set up and opened to researchers both at home and from abroad so that they can use this heavy-ion accelerator. It will enable China to launch high-level scientific research projects, to engage in international competition, and to rank itself among the world's most advanced. [passage omitted] This heavy-ion accelerator, developed in Lanzhou, is a low-to medium-energy accelerator.

Thirty 'Spark Plan' Centers To Be Set Up in 1990

40080071b Beijing XINHUA Domestic Service in Chinese 1206 GMT 6 Dec 88

[Local News Broadcast Service]

[Text] Beijing, 6 Dec (XINHUA)--The State Science and Technology Commission recently made arrangements for future tasks of the "Spark Plan" and decided to set up 30 national-level "Spark Plan" technological centers next year. Provinces and municipalities may also set up provincial-level and municipal-level "Spark Plan" technological centers according to local needs.

Next year, the commission will accelerate and promote the development of "Spark Plan" enterprise groups, gradually improve them, and make them develop in the direction of well-organized joint-stock corporations. It plans to improve and develop enterprise groups in chemical, building material, and aquaculture industries and in related intensive processing industries; in mountain region and beach development; in light, textile, and garment industries; in agricultural and sideline product intensive processing; and in mechanical and electrical appliances and food industries next year. It also plans to develop famous-brand products, with the output value of each product amounting to 10 million yuan or 100 million yuan.

SCIENTISTS, SCIENTIFIC ORGANIZATIONS

BRIEFS

Biomedical Engineering R&D Center—On 27 September 1988, the Xin Shiji (New Century) Biomedical Engineering Research and Development Center was established in Beijing. The joint high-tech and economic entity consisting of civilian and military research workers is centered around the Electro-engineering Research Laboratory of the Institute of Air Forces Medical Sciences and will be involved in scientific research, development, production, and marketing. [Summary] [40081010 Beijing GUANGMING RIBAO in Chinese 30 Sep 88 p 1] /9604

Calculation of Buffet Boundaries for Swept Wings in Transonic Flow Regime

40090025b Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] in Chinese Vol 20 No 5, Sep 88 pp 453-459

[English abstract of article by Zhang Guofu [1728 0948 1381] of Nanjing Aeronautical Institute]

[Text] A numerical computational method has been developed to predict the buffet boundaries of swept wings in the transonic flow region. Thomas' existing criterion for determining buffet boundaries of airfoils at transonic speeds has been extended to include the case of wings with high sweep. This is accomplished by employing an infinite yawed wing for which the three-dimensional turbulent compressible boundary layer is determined by an integral method developed by the author, while the transonic pressure distribution is calculated by Eberle's finite element method.

A comparison between calculated buffet boundaries using this method and boundaries measured for the F-86A aircraft in flight shows good agreement.

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Domestically Made Solar Cells Meet International Standards

40080057 Shanghai WEN HUI BAO in Chinese 10 Oct 88 p 1

[Article by Qian Weihua [6929 4850 5478]: "Special Dispatch on 'Fengyun 1' ['Wind and Clouds 1'] in Outer Space: Domestically Made Solar Cells Further China's Space Technology--Tested for a Month Under the Harsh Conditions of an Outer Space Environment, Their Performance Has Been Consistently Excellent and Their Operation Normal, Demonstrating That China's Astronautical Power Supply Technology Meets Current International Standards"]

[Text] (Special Report)--Researcher Li Guoxin [2621 0948 2946] of the Shanghai Astronautical Base's Xinyu [2450 1342] Electric Power Supply Plant revealed to this reporter a few days ago that China's space power supply technology meets current international standards.

Li Guoxin is one of the chief designers of the power supply system of the 'Fengyun 1' satellite launched by China for the first time a month ago. According to a report from the Xi'an Satellite Ground Telemetry Center, he said, Fengyun 1's solar cell system, with a total power of over 800 watts, has undergone a month's severe testing in an outer space environment; it has performed well and operated normally all along.

According to the report, the large (almost six square meters in total area) fold-out solar array on board the satellite has over 14,000 silicon solar cells on it. Great Britain's Royal Aircraft Establishment, to which the solar cells were sent for rigorous testing, has certified that all their technical indicators meet European Space Agency standards.

Researcher Li Guoxin told this reporter that Fengyun 1 has carried out another research project in the area of international space high technology: included among the 14,000-plus solar cells was one sheet made from the new material gallium arsenide. Over its [month-long] testing in the environment of outer space, this type of cell, jointly developed by the Chinese Academy of Sciences' Shanghai Metallurgical Institute and by the Xinyu Power Supply Plant, has demonstrated a photoelectric conversion efficiency of 15.8 percent. This efficiency has been precise and stable throughout, and precision has been higher than that of similar foreign products. This achievement will have a profound influence on the further development of China's satellites, airships, and other spacecraft.

Briefs

High-Altitude Simulator Completed--A major national defense industry project--the high-altitude simulation experimental facility for exhaust cooling equipment--has been completed by the Lanzhou Petrochemical Machinery Plant. On 17 October, parties involved sent representatives on a special trip to the plant to express their appreciation and to commend them for their high-tech, high-quality contribution to national defense. The first to be produced in Asia, the high-altitude simulation experiment facility--also dubbed "Project 624"--is a major high-level aeronautical project specially for the purpose of researching new aircraft powerplants. Today, only the United States, the Soviet Union, the United Kingdom, and France have comparable facilities, China being the fifth country in the world to build one. In late 1984, the Lanzhou Petrochemical Machinery Plant was recommended for the handling of the critical link of the facility--the exhaust cooling device. After 2 years' work, the project was successfully completed in June of this year. [Excerpts] [40080063 Lanzhou GANSU RIBAO in Chinese 18 Oct 88 p 1]

New Wind Tunnel Complex--China's scientists and technicians have completed a large-scale wind tunnel complex in the Southwest. The culmination of a 20-year effort, the complex has already conducted 220,000 experiments involving aircraft, missiles, satellites, and other space vehicles. The complex, entirely Chinese designed and built, consists of 27 large and medium experimental components, some of which are equal to or surpass world standards. [Text] [40080069a Shanghai JIEFANG RIBAO in Chinese 27 Oct 88 p 1]

Experimental Measurement of J Parameter, δ_t on Special Shape Plates with High Strain Gradient

40090025a Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] in Chinese Vol 20 No 5, Sep 88 pp 411-420

[English abstract of article by Zhao Yong [6392 0516] of the National Nuclear Safety Administration, Beijing; Li Zezhen [2621 3419 7201], et al., of the General Machinery Research Institute, State Commission of Machinery Industry, Hefei]

[Text] Regarding the special shape plates of 16 MnR steel simulating the strain fields of the pressure vessel nozzle region, the elastoplastic fracture J parameter and CTOD δ_t curves in the high strain gradient fields have been measured by the multiple specimen technique and the microphotography technique, respectively. The formula to evaluate J and the relationship between J and δ_t were obtained with computer multiregression and parametric analysis. A new method of closely combining the experimental study of small specimens and that of practical nozzle structures has been presented.

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Drug Resistant Spectrums, R Plasmid Carrying Rates of S. Dysenteriae Type 1

40091010a Shanghai ZHONGHUA CHUANRANBING ZAZHI [CHINESE JOURNAL OF INFECTIOUS DISEASES] in Chinese Vol 6 No 3, Aug 88 pp 133-136

[English abstract of article by Li Lijin [2621 4539 3160], et al., of the Department of Medicine, The Second Hospital, Tianjin Medical College]

[Text] The drug resistant spectrums of S. dysenteriae Type 1 (32 strains) and S. flexneri (57 strains), tested by 8 antibiotics including streptomycin, tetracycline, sulfadiazine, chloromycetin, ampicillin, gentamycin, kanamycin, and their transferable drug resistant plasmid (R plasmid) carrying rates, using E. coli k-12 c600 F-Rif^r as the recipient, were studied. The authors found that chloromycetin, tetracycline, streptomycin and sulfadiazine resistances were the most predominant drug resistant spectrums in S. dysenteriae Type 1 and S. flexneri, respectively. The R plasmid carrying rate of S. dysenteriae Type 1 was 65.2 percent, much higher than that of S. flexneri (42.1 percent) and much lower than that of S. dysenteriae Type 1 in other countries. Consequently, homology of S. dysenteriae Type 1 cannot exist between the Tianjin strains and those of other countries. It is possible that surviving S. dysenteriae Type 1 in China have been revived.

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Bacteriological Study of Escherichia Coli Meningitis

40091010b Shanghai ZHONGHUA CHUANRANBING ZAZHI [CHINESE JOURNAL OF INFECTIOUS DISEASES] in Chinese Vol 6 No 3, Aug 88 pp 161-164

[English abstract of article by Yang Zhengshi [2799 2973 2514], et al., of the National Institute for the Control of Pharmaceutical and Biological Products, Beijing]

[Text] This paper reports the two strains of Escherichia coli isolated from the blood and cerebrospinal fluid of a child. The bacterial strains were agglutinated with B group serum of Neisseria meningitidis. They possessed the K₁ antigen by serologic test and antigenic analysis. Their antigenic formula is O₁₅:K₁:H-, and a serological diagnostic method for the K₁ antigen of E. coli is described. The relationship between E. coli with the K₁ antigen and neonatal meningitis and septicemia is discussed.

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Screening of High Yield Alkaline Protease-Producing Strain, Studies of Its Fermentation Conditions

40091007a Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 28 No 3, Sep 88 pp 249-256

[English abstract of article by Na Shumin [6719 3219 2404] and Yu Maoxiao [0151 5399 0509] of the Institute of Microbiology, Chinese Academy of Sciences, Beijing]

[Text] A total of 553 *Bacillus* strains were isolated from soil samples. After treatment combining ultraviolet light and NTG, a mutant 533-F13 producing 10,000 u/ml of alkaline protease in the culture broth was obtained from all 553 strains.

The medium for fermentation consisted of 6 percent sweet potato meal (maize meal or glucose), 4 percent soy bean cake meal, 0.4 percent $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$, 0.03 percent KH_2PO_4 and 0.1 percent Na_2CO_3 . The strain produced maximum alkaline protease activity after growth at 37°C for 42-46 hours on a rotary shaker. The optimum pH and temperature for the protease activity production are pH of 9-10.5 and 60°C, and it is inhibited by DFP. Some other properties of the enzyme are discussed in detail.

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Studies of Fermentation of L-Arginine

40091007b Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 28 No 3, Sep 88 pp 257-264

[English abstract of article by Gong Jianhua [7895 1696 5478], Ding Jiuyuan [0002 0036 0337] and Chen Qi [7115 3823] of the Institute of Microbiology, Chinese Academy of Sciences, Beijing; Lu Zhiqiang [6424 1807 1730] of the Department of Biology, University of Science and Technology of China, Hefei]

[Text] Studies involving the fermentation of L-arginine have been conducted using a L-arginine-producing strain, *Corynebacterium crenatum*, 971.1 (SG⁺, His⁻), with a shaking flask. The results show that L-histidine and biotin are required, but at concentrations that differ according to cell growth and L-arginine production. A high concentration of (NH₄)₂SO₄, used as the nitrogen source, was necessary for the production of L-arginine. In addition, a certain amount of oxygen-supplying activity is an important factor for L-arginine accumulation. A maximum value of 34 mg/ml was obtained under optimum conditions on a shaking flask incubated for 96 hours.

The product was isolated and purified from a culture broth with ion exchange chromatography, and was identified as L-arginine through bioassay, specific rotation, infrared absorption spectrum, elemental analysis and paper chromatography.

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Studies of Acetyl-CoA Synthetase of *Candida Tropicalis* Producing Dicarboxylic Acids From Alkanes

40091007c Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 28 No 3, Sep 88 pp 265-269

[English abstract of article by Yi Zuhua [2496 4371 5478] and Yu Zhihua [0151 1807 5478] of the Institute of Microbiology, Chinese Academy of Sciences, Beijing]

[Text] Through a study involving the mechanism of accumulating long-chain dicarboxylic acids from alkanes by a mutant strain U_{3-21} derived from *Candida tropicalis* strain 1230, the acetyl-CoA synthetase of both strains has been determined. The results show that the optimal pH for the enzymatic reaction is 6.8, and the K_m value for acetate is 1 mmol/L. The enzyme is thermolabile, and that of the mutant is more sensitive than one of the wild strain. Incubated at 30°C for a half hour, the enzyme of the former lost 18 percent of the activity, while the latter lost 50 percent. After two hours, the former lost 55 percent of the activity and the latter 95 percent.

A comparison of the acetyl-CoA synthetase activity of the mutant with that of the wild strain was conducted. The specific activity of acetyl-CoA synthetase from the wild strain was two times that from the mutant. In fact, the growth rate of the mutant was lower than that of its parent strain, too. This revealed that the enzymes in both strains were involved in the de novo synthesis of fatty acids as well as the growth of the organism. It is recommended that, for the production of long-chain dicarboxylic acids from alkanes by the mutant U_{3-21} , the incubation period of the seed culture be adequately lengthened.

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Studies of Endotoxin of *Leptospira*. II. Effects of Leptospiral Lipopolysaccharides on Rabbit's Leukocytes, Lethality to C57BL/6 Mice

40091007d Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 28 No 3, Sep 88 pp 270-274

[English abstract of article by Nie Dikai [5119 4574 2818], Shi Manhua [2514 2581 5478], Zhu Guifeng [2612 2710 7685], Liu Yongming [0491 3057 2494], Wu Suhuai [2976 4790 2037], Jiang Shuxian [1203 3219 6343] and Wang Huanqin [3769 3562 5367] of the Institute of Epidemiology and Microbiology, Chinese Academy of Preventive Medicine, Beijing]

[Text] Intravenous injection of rabbits with leptospiral LPS as well as the *E. coli* endotoxin was found to induce transient leukopenia followed by marked leukocytosis. The intravenous infection of C57BL/6 mice with $4-5 \times 10^6$ BCG could improve the lethality of the *E. coli* endotoxin in the animal over 96-fold. It also increased the animal's susceptibility to the lethality of leptospiral lipopolysaccharides. The administration of AM-D simultaneously with leptospiral LPS to C57BL/6 mice could also increase the lethality of the LPS. The LD₅₀ of the LPS was detected to be 234.9 µg in the AM-D treated mice.

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BRIEFS

New High-Yield Disease-Resistant Hybrid Rice--A type of high-yield and disease-resistant hybrid rice '84-15' distant hybrid rice, which can be used as seeds for years without being rebred, has been developed as a result of 10 years of research by Chen Jiansan, the developer of rice asexual production methods and an associate research fellow in the Chinese Academy of Agricultural Sciences. Having developed dwarfism breeding, 3-strain hybridization, and anther tissue cultures, the center's recent achievement was the producing of the unfused distant hybrid rice. The plants grown from these unfertilized seeds tend to be more adaptable, more resistant to diseases such as rice blast, bacterial blight disease, sheath and culm blight of rice, and also have better spikes with more kernels, shorter ripening time, and tougher stalks. In 1987, trial experiments showed that the sowing of the sixth generation of the '84-15' hybrid rice yielded 12,000 kg per hectare, 22.2 percent higher than that of non-glutinous rice strain #107 (Zheng Jing 107). The 1988 trial sowings of the seventh generation '84-15' hybrid on 2000 hectares in the Huanghuai and Jianghuai areas yielded 8,250 to 9000 kg per hectare, 10 to 15 percent higher than the local conventional varieties. [Summary] [40081009 Beijing RENMIN RIBAO (OVERSEAS EDITION) in Chinese 5 Oct 88 p 4] /9604

Degassing Radioactive Gases, Calculation of Degasification Efficiency With Pressurizer in PWR

40090029a Chengdu HE DONGLI GONGCHENG [NUCLEAR POWER ENGINEERING] in Chinese Vol 9 No 5, Oct 88 pp 1-6, 59

[English abstract of article by Shen Jielin [3088 0094 2651]]

[Text] This paper briefly describes the necessity of degassing radioactive gases and the principle of degasification with a pressurizer in a PWR. The formulas for calculating the efficiency are derived, the factors affecting efficiency are analyzed and the methods for determining the degassing operation parameters are discussed.

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Effect of Shot-Peening on SCC Resistance of Steam Generator Heat-Transfer Tube Material

40090029b Chengdu HE DONGLI GONGCHENG [NUCLEAR POWER ENGINEERING] in Chinese Vol 9 No 5, Oct 88 pp 7-16

[English abstract of article by Feng Jiarui [7458 0857 3843], et al.]

[Text] The SCC (stress corrosion cracking) resistance of 18-8 austenitic stainless steel and Incoloy-800 alloy in a $MgCl_2$ medium can be increased by surface compressive stress and a hardening layer structure which are caused by shot-peening. However, in 260°C water containing 500-1000 ppm Cl^- , with or without adding 1 percent H_2O_2 , in the same oxygenic medium, only if the integrity of the hardening layer has not been damaged and the surface remains under compressive stress can the shot-peening improve the SCC resistance. If the shot-peening surface suffers a large deformation and the integrity of the hardening layer is damaged by tension strain or corrosion, the shot-peening offers no advantages.

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Calculation of Fission Product Transport, Release to Environment During PWR Accident

40090029c Chengdu HE DONGLI GONGCHENG [NUCLEAR POWER ENGINEERING] in Chinese Vol 9 No 5, Oct 88 pp 60-69, 74

[English abstract of article by Li Ziping [2621 5261 1627], et al.]

[Text] This paper discusses the mechanism of removing airborne fission products, such as iodine, methyl iodine and aerosol particles, during a PWR core meltdown accident. A multicompartment containment model, FIPREA, for analyzing airborne fission product transport and release to the environment from containment is developed. The removal of fission products by decay, natural deposition on the surface or absorption in water film, filtration spray washout, steam condensation, leakage to the environment and gas convection flow between multicompartment rooms is taken into consideration simultaneously in this model. A computer program FIPREA to calculate the atmospheric release of airborne substances has been encoded based on the same containment model. The computed results are compared and analyzed, and have been found to be satisfactory.

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COMPUTERS

Recent Analysis of China's Computer Markets

40080056a Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 37, 28 Sep 88 p 2

[Article by Chen Jingxing [7115 2417 6821]: "An Analysis of Characteristics and Trends in the Current Computer Market"]

[Text] For many unforeseen reasons, during the current wave of restructuring and liberalization, the production and sales of computers have alternately shown both optimistic and pessimistic tendencies. So the questions "What is the state of the current computer market?" and "In which directions is it growing?" have been much in the minds of people. According to the chief economic indicators for 32 key computer enterprises and to "production and marketing deposits" statistical data, the characteristics of the computer market during the first half of this year may be described as follows:

1. Market demand has slowed and income from product sales is not growing quickly.

Income from sales of products from all enterprises was 306 million yuan during the first half of this year, which is a growth of 0.98 percent over the same period last year, i.e., basically stable. Microcomputer manufacturing enterprises (32) produced 12,148 units during the first half of the year, which was 4.89 percent more than the same time last year. Nineteen enterprises showed an increase in income from sales, or 59.4 percent of the statistical base, among which 12 firms had increases of more than 50 percent or 37.5 percent of the base. Units at Plant No. 738, the Electronic Equipment Plant, the Shenyang Computer Plant, and the Jiangmen Computer Applications Equipment Plant had even greater growth over the previous year, their income from sales doubling. Thirteen units showed a decrease in income from sales i.e., 40.6 percent of units, among which five showed decreases in excess of 50 percent, or 15.6 percent of units.

2. Production exceeded sales, and inventories are rising.

Industrial gross output value reached 559 million yuan for the first half of this year, which was a growth of 34.6 percent over the same period last year, but because the rise in production was even greater, the capacity of the marketplace to absorb that production weakened. With production greater than sales, inventories grew 48.6 percent over that of the same period last year. Aside from stock at the 11 units that are the Huabei Terminal Equipment Plant, the Zhongnan Computer Plant, the Beijing Computer Plant No. 3, the Hunan Computer Plant, the Jiangmen Computer Applications Equipment Plant, the Xinan Computer Company, the Tianjin Computer Plant, Plant No. 738, the Dalian Radio Plant, the Weifang Computer Company, and the Baoding Radio Laboratory, stock at the other 23 units rose at differing rates. Although stock at some units grew over that of the same period last year, there was a great decline when compared to the end of last year, which was one bright spot, and those stocks are continuing to be moved out. But stock at some units has grown alarmingly and sales have been difficult.

3. Product competition has been fierce, and the profits of production units have begun to "slide."

As market demand has slowed, many customers are postponing purchases. This has led to fierce competition for product performance and pricing. Product sales prices have declined, there has been another increase in the prices of raw materials, foreign currency rates are rising, and costs are increasing, all of which has forced too much of enterprise reserves into use, and profits have continued to decline. In the first half of this year, surpluses of circulating funds have exceeded norms by 538 million yuan, which is an increase of 9.14 percent over the same period last year; bank loans were 505 million yuan, up 22.45 percent; circulating capital turned around in 316 days, slower by 24 days; total profit taxes declined 10.16 percent, per capita profit taxes declining by 7.34 percent, and certain enterprises have experienced losses.

Current trends in computer sales are serious, and from the point of view of production planning the industrial gross output value for the first half of this year is 45.98 percent of the yearly plan, so that basically the time has half passed and the goals have been completed. As determined by sales of computers throughout a year, trends for the latter half of this year for sales should be better than for the first half. The following trends should be apparent:

a. Sales of microcomputers with a better cost performance ratio will become predominant.

After several years of experience with dissemination and applications, when buying computer systems, current computer customers no longer do so blindly as in the past, but will "get three bids," both to require a good price to performance ratio, and also to demand preferential

conditions. Generally speaking, when there are two of the same machine, one naturally wants the one that has been upgraded, since older products are eventually replaced by newer ones. As for example with the China Computer Technology Service Company, whose model 0520CH computer had total sales of 1,064 during the first half of this year, a decline of 64.8 percent over last year during the same period, while the 1,064 total sales during the first half of the year for the BCM-0530 produced by the Beijing Computer Institute was nearly 16 times the amount for the same period last year, and sales of 509 for the Donghai model 0530B during the first half of the year exceeding the supply. The second half of this year saw the introduction of a 386 machine from the Great Wall group, which has already found favor with many customers.

b. There is a greater proportion of single-board computers and of special-purpose computers compared to last year.

Because of less necessary funding and fast results, in the current situation of tight money, single-board computers and specialized machines have been a corresponding increase in market sales. According to statistics from 19 single-board computer manufacturing enterprises, sales during the first part of this year grew 166.6 percent over those of the same period last year. Also, sales this year were greater than production for the period, so inventories dropped significantly, some 53.2 percent less at the end of June than the previous year. Of the more outstanding, total sales during the first half of the year for the WXX-2 controller board made by the Wuhan Computer Plant were 5,250, a growth of 460 percent over the same period last year, and end of June inventories also declined by 26.3 percent. Or, take the CTX-Z produced by the Huabei Terminal Equipment Plant; 2,769 were sold during the first half of the year, 16 times the sales [i.e., 1500 percent growth] for the same period last year. End of June inventories greatly declined, which realized 3.9 million yuan in capital potential.

c. Prospects look good for continued growth in printer sales.

Printers are not expensive, and aside from the fact that they can be fitted to computers, they can also be used independently, used broadly in office automation, and over the past few years have shown a continued good sales picture. According to partial statistics from some of the manufacturing enterprises, there has been growth of 25.1 percent over the same period last year, and inventories dropped 14.4 percent. As an example, the printer produced by the Weifang Computer Company had sales of 282 units, a rise of 52.4 percent over the same period last year, and end of June warehouse stock declined 43 percent. For the latter half, a printer with an especially good price to performance ratio will become a hot item.

Growth, Diversification of Computer Industry in Tianjin

40080056b Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 37, 28 Sep 88 pp 34, 36, 42

[Article by Zhang Xiongwei [1728 7160 0251] and Wu Baoyuan [0702 1405 3293]: "The Growing Computer Industry in Tianjin Municipality"]

[Text] Tianjin Municipality is an important industrial open area in China where steps were taken in the computer industry earlier than elsewhere, and for more than 30 years it has gone through the entire process of four generations of computer development. Growth in the economies of scale over the past few years have allowed it to constitute a computer industrial system with a solid foundation, abundant technological strength, and a full complement of products.

1. Early development, producing a better foundation.

The first analog electronic computer in China was born at the Tianjin Municipal Electronic Computer Plant in 1958, and its appearance filled a void in China's computer industry. Since then, there has been a succession of 129 analog computers in eight types. Development and production of the analog computer set the stage for the development of the digital computer, and in 1965 the Tianjin Computer Plant cooperated with various other units to create the model 441B computer. At the same time, one plant was specializing in the manufacture of printers--the Tianjin Red Star Factory, which also produced such peripheral equipment products as card manufacturing machines, photoelectric machinery, and rapid 15-row printers, both of which made a contribution to the growth of China's computer industry.

In the early 1970s, the Tianjin Municipality Institute of Radio Research changed the focus of its technology to the development and application of electronic computers, changing its name in the early 1980s to the Tianjin Municipality Computer Institute, and becoming one of the earliest development units for China's 1000-series minicomputers. After successful development of the first China-produced model 130 minicomputers, it then quickly developed the general models 120, 110, and 132. With the upgrading of foreign sample machines, it was the

earliest to produce the model 153 and the 133 and 115 military-use ruggedized computers that were suitable for harsh environments. They made a thorough analysis of the 1000-series system software, doing much work on the dissemination and application of that series. The Office of Computer Industry Management of the former Ministry of Electronics Industry (MEI) placed the 1000-series software center at that institute.

To meet the demands of the restructuring, in 1987 Tianjin Municipality established the Tianjin Municipality Zhonghuan Computer Company--a specialized consortium of companies engaged in research and development, production and marketing, and dissemination services for computers, peripherals, and their systems engineering. This company has five plants and two institutes, with 4,000 employees, among which 26 percent are engineers or technicians. The Zhonghuan brand of micro- and minicomputers, learning machines, industrial controllers, Chinese character terminals, color graphics terminals, monitors, printers, word processors, modems, computer power supplies, and floppy disks have a distinct presence in the domestic marketplace.

Output value for the Tianjin Electronic Computer Plant in 1987 reached 61.84 million yuan, which ranked tenth in the nation; sales volume was 35.06 million yuan, producing 6.81 million yuan in profits tax and a per capita profit of more than 10,000 yuan.

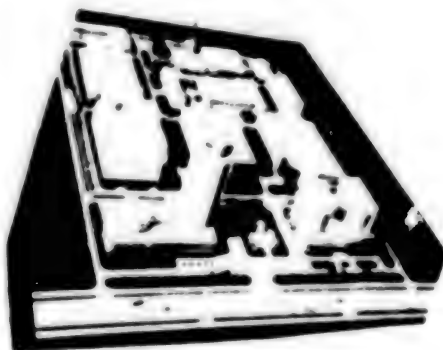
The equipment-room accessories industry of the Tianjin computer industry is also getting stronger. To keep this rising new industry from encountering the restrictions that arise when each locality creates its own system, MEI decided, upon consultation with the Tianjin Municipal government, that it would create a national company in Tianjin that would engage in this kind of business. In 1985, 13 firms that Beijing, Tianjin, Shanghai, Hebei, Shanxi, Jiangsu, and Hubei joined to form the China Equipment-Room Facilities Engineering Company in Tianjin, and growth over more than 3 years has allowed the equipment room engineers from this company to cover more than 80 percent of China. The main component of the company in Tianjin is an economic entity that is bound by engineering contracts, and that based upon design has begun full-service operations to continually improve the level of enterprise product accessories and of engineering capacity.

As the restructuring has progressed, computer enterprises and companies that are jointly funded with foreign commercial interests, as well as the various computer systems and application and development services entities of the laterally associated cooperative enterprises, have sprung up everywhere, and these have become part of the ranks of computer industries in Tianjin Municipality, which has further spurred the development of the computer industry in Tianjin Municipality.

2. The technology transformation and scale of production.

For the period of the national Seventh 5-Year Plan, it was planned that the microcomputer would be the focus of growth for China's computer industry, and that by 1990 production would reach 200,000 units. This

would lead the growth of larger computers, and key areas were to be north China, eastern China, and southern China. But the original scale of operations and capacity could in no way have attained this goal, and when faced with this problem of the growth of the Tianjin computer industry, MEI and the Tianjin Municipality government exchanged ideas at all levels, then decided to allocate 170 mu of land upon which to erect a small modern computer industrial area that could operate on a significant scale. This small industrial area is located within the science part planned by the Tianjin Municipality government to develop high technology. Construction of the first phase project--24,000 square meters of completely enclosed clean-room workshops and accompanying facilities, was complete in September and is now in operation.



This is a model of the Tianjin Municipality Computer Industrial Park. This industrial park borders on the new Tianjin New Technology Park, and will occupy 110,000 square meters, upon which it is planned to construct five production lines for microcomputers, minicomputers, single-board computers, disk drives, and display terminals, as well as a group of Sino-foreign joint ventures. After completion of the computer park, this will become a key base for computer construction in China. The first phase of the project has now been completed, and it contains 24,000 square meters of completely enclosed uncontaminated workshops and accompanying facilities, which will then be turned over for use.

The Tianjin Municipality Electronic Computer Plant has brought in a computer general purpose flexible manufacturing assembly line that is of international standards for the 1980s. This completely automated equipment handles component selection, assembly, and debugging, as well as tests for the life of the entire product. There are 83 stations of 47 different kinds, and annual production capacity is 20,000 microcomputers and 300 minicomputers. In 1987 this production line handled 2,000 units of the Great Wall 0520CH and 1,500 units of the Zhonghuan CT100 Chinese-English terminal; quality is stabilized and performance is reliable. The level of its technology is in the front ranks domestically, and sampling tests of the Great Wall 0520CH system with one-time disassembly yielded a 97 percent-and-greater pass rate, which won production certification by the China Computer Development Company.

The Tianjin Radio Plant brought in a learning machine production line capable of producing 20,000 units a year, and at the same time, the Tianjin Radio Plant No. 5 also imported a production line for modems, both of which have brought a change to the previous situation of low-volume production.

The monitors manufactured by the Tianjin Municipality Display Plant have one-half the market for domestically produced machines, and this year will export 5,000 units. Currently, the Tianjin Municipality Display Plant will be importing an assembly and burn-in production line capable of producing 200,000 monitors annually, and it is estimated that construction will be completed at the end of October, when the line will go into production.

To hasten the growth of favored industries, the Tianjin Municipality Equipment-Room Facilities Plant has imported from Italy a cast-aluminum-alloy antistatic floor production line, which has a production capacity of 50,000 square meters per year. The China Equipment Room Facilities Engineering Company was founded more than 3 years ago, and by adopting service that unifies design, construction, and operations it has been involved in construction projects throughout China that exceed 40,000 square meters in area.

1988 has been the year that growth of the computer industry in Tianjin Municipality really took off. Leaders of MEI and of the Tianjin Municipality government have been exchanging ideas on the problem of development of the Tianjin computer industry for nearly two years, and they have jointly formulated an initiative that invests 150 million yuan into the development of the computer industry in Tianjin Municipality. The initiative calls for ultimate development of fourth-generation computers as its goal and outline, and the Computer Industrial Park as its basis. It will make full use of the favorable investment in Tianjin Municipality, and will make full use of the various means of domestic association and foreign cooperation, such as joint funding, cooperation, and wholly-foreign-owned enterprises. This effort will establish a base for the computer industry that has a significant economy of scale and strong capabilities for export and that will serve development, production, and technology. After the technological transformation of the Sixth and Seventh 5-Year Plans, the computer industry of Tianjin Municipality possesses certain advantages that have enhanced development reserves, and it has gone into a favorable cycle, which provides outstanding conditions for the prosperity of the computer industry in Tianjin.

3. Development of new products and good provision of services.

During the Seventh 5-Year Plan, both imported technology and product development have been used to meet market demands. What has certainly been the major production and development enterprise in Tianjin over the past year--the Zhonghuan Computer Company--has developed more than 150

new computer products, and has learned enough from foreign samples to introduce 40 products into the domestic market. Its computer products constitute a series that is complete and that covers a wide range. For example, the Zhonghuan 0674 (UV68) 32-bit supermicrocomputer, the Zhonghuan 0530 (AT), the Zhonghuan 0405 (STD BUS) industrial control single-board computer, the Zhonghuan CT-100 Chinese-English terminal, the Zhonghuan 03 learning machine, the HM-2233 monitor, color graphics display terminals, and the 1200/2400 modem have all achieved widespread use in scientific computation, in the integration of mechanics and electronics, in teaching, in CAD, in traditional industrial technological transformation, and in office automation.

The UNIX V5 operating system, the Sinicized INGRES database management system, and the microcomputer light pen comprehensive test instrument developed by the Tianjin Municipality Electronic Computer Institute, and the Zhonghuan CT 100 Chinese-English terminal from the Tianjin Municipality Electronic Computer Plant have won 1987 Tianjin Municipality prizes for scientific and technical achievement.

Beginning with their development of sand-cast aluminum antistatic moving floors, the Tianjin Municipality Equipment-Room Facilities Plant has developed low-pressure and high-pressure aluminum-bar alloy antistatic moving floors, and in the field of equipment-room specialized air conditioners, they have developed specialized air-conditioning systems to six specifications in two overall water cooling and wind cooling systems, as well as a new series of equipment-room products having wind system units and grilled light fixtures. Using baffle-less air filters and fluid-cell encapsulation technologies, air purification in technological work areas can reach level 10 and higher.

The Tianjin Radio Plant No. 7 has developed the VPS uninterruptible power supply, which is available in a series of products from 0.5 kW to 25 kW.

On the basis of an assimilation of foreign sample products, the DJKS-86 made by the Tianjin Municipality Automated Instruments Plant integrates Chinese-produced programmable controllers, and is a microprocessor-based technology making special use of control systems to replace relays. It can be quickly modified to suit conditions of use that have changed, as well as to comprise control systems with new logic. It has been awarded the prize for outstanding new products as issued by the State Economics Commission, and can be provided in modules of more than ten functions.

The constant increase in installed computers throughout China is challenging technology servicing with greater and greater demands, for which reason the Tianjin Municipality government is funding and supporting the creation of a computer repair and service center. This was established in 1987 at the Tianjin branch office of the China Computer Technology Service Company, and has also joined a repair

service network with more than 40 other computer technology service companies throughout China. It owns clean-room environments and various modern maintenance equipment, and can quickly and accurately test and restore the circuits of different computer products. In the past year they have repaired some 2,500 microcomputers for customers. Technology training efforts have also developed to first and second levels for pre- and post-sales training; there are training classes of various sorts that address different targets and different levels. They have improved the standards of operations for user operations and have developed their capabilities.

4. Paying attention to applications and stimulating development.

The growth of the computer industry lies in the marketplace, and the key to the marketplace is applications. Only by disseminating computer applications can the growth of the computer industry be promoted. In recent years, the Tianjin Municipality computer industry has faced up to the marketplace, to society, and to customers as it has completed more than 850 computer applications projects for the larger computers. The fields of these applications have expanded from the original scientific computational statistics to 18 fields such as industrial process control, intelligent electromechanical products, urban planning, office automation, and the electronification of banking, all in both Tianjin and also other provinces and municipalities throughout China. More than 90 of these projects have been awarded prizes for scientific and technological achievement at the ministry and municipality levels. Broad use of computers in these sectors will bring even greater economic and social results to enterprises.

The key players in developing industrial process-control technologies are the Tianjin Municipality Institute of Automated Instruments, the Tianjin Municipality Institute of Automated Instrumentation and Associated Design, the Tianjin Electronic Computer Plant, the Computer Institute, and the Office of Computer Applications. For several years, the fields of boiler, kiln, and electric furnace automated control, beer antibiotics, data collection for the fermentation control of glutamic acid, for steel-smelting furnace temperature control and for electric furnace thermometric oxygen jets, and the control of and communication with urban use of water pumping stations have all made broad use of computer applications technologies. One of those technologies has been the STD Bus industrial control computer for a kiln furnace control system manufactured by the Tangshan Construction Ceramics Plant and the Tianjin Glass Factory No. 5. It offers stable and reliable operation and results in an annual savings of some 5-600,000 yuan, and has also extended the useful life of equipment, so that its economic results have been quite clear.

The Tianjin Computer Plant has used a 32-bit supermicrocomputer to develop processing systems for banks and to implement intra-regional general savings and conversion, where each day 1.1 million yuan of funds in transit can be entered in accounts one or two days earlier, resulting in annual benefits of more than 1 million yuan.

The Tianjin Computer Institute has developed circuit-aided-analysis and printed-circuit-board-aided-layout CAD systems that have raised the standard of circuit design. They have also designed plotting CAD systems that can be used for charting the graphics plots of the machinery, electronics, meteorology, geology, and construction industries. The widely applicable PLAN [token-passing local area network] 5000 network system used by the Tianjin Municipality Institute of Computer Applications establishes new database and Chinese-character real-time communications, which has resolved problems with the many different types of microcomputers that have been networked, and the offices of the Tianjin Municipality government and the Office of Municipal Commerce have used the PLAN 5000 network to obtain excellent results.

5. Foreign cooperation and international competition.

Tianjin is an open, modern international port city that has a superb investment climate, a good industrial base, and many technical personnel, all of which makes for a strong situation regarding foreign cooperation and for forming lateral associations domestically. In recent years, Tianjin Municipality has established operations of a "three forms of import processing and compensatory trade" nature with international commercial computer interests. At the same time, there have also appeared a number of rising new computer enterprises that are domestically aligned and that transcend regions and industries.

Tianzhi Communications Company, Ltd. is a Sino-American joint venture that develops and produces stored-program-controlled (SPC) exchanges as its principal product. Total U.S. investment has been 9 million US dollars, and this joint venture company has become a key national project—one of the three Chinese bidding enterprises seeking bids on the Daqing Railroad project exchange equipment, and it is also a designated unit for the nationally produced digital SPC exchanges. The MSX SPC subscriber exchange it manufactures is an internationally fourth-generation product integrating languages and data in its transmission capabilities. It uses distributed processing through several microprocessors, has high-level languages, pulse-code modulation, time-division multiplexing, stored program control, and local-area network technologies.

The Zhongbei [North China] Computer Service Company, Ltd., is a Sino-British joint venture engaged in the development of computer software technology with an investment of 500,000 UK pounds, and all company technical personnel have undergone rigorous examinations, as well as receiving specialized training in development efforts in England. It is capable of assuming the development of international software projects. Over the past two years and after bringing in various innovative and internationally popular fourth-generation computer languages, it came up with the fourth-generation language SPEL, domestically produced. And using this language, it has created software for export that is directed toward international markets.

The Tianjin K. C. Company, Ltd., is a Sino-Japanese joint venture established in the Tianjin Economic and Technological Development Park, which principally manufactures and operates computers and peripherals, as well as other electronics products. It is an economic entity that combines technology, industry, and commerce. The investment interest in this company, the Japanese K. C. Company, has always worked hard to help the cause of domestic microcomputer development in China, and has made a significant contribution to the domestically produced Great Wall 0520, the Beijing BCM, and the Tianjin TWS series of computers. Since its inception in 1986, this joint venture has also exerted itself in the development and manufacture of microcomputers, printers, and other application products, and within a very short time developed the KC-1740TIC circuit testing instrument and a parallel interchange interface. And for planning of the new microcomputer currently being developed in Japan, the TRON, this joint venture company has arranged a TRON research conference to trace and study relevant new technologies, and to serve as a reference for similar industries in China. "Jointly developed export products" is one of the guiding principles of the company. Besides developing various high technology products on its own, the Tianjin K. C. Company has paid special attention to cooperation with domestic enterprises, research units, and colleges and vocational schools. It is using the advantageous situation of its company to enter its products in international markets.

The TTOA Tiantong Office Automation Applications Development Company is a joint venture company founded in 1986, and the company has focused on the development and application of office automation. It is currently making the TS-4000 Chinese/foreign-language electronic typewriter. The large screen TS-4000 fills a void in China's electronic typewriter field, and the company has both the capacity for development, and also for after-sales service.

Take advantage of opportunities and take part in the overall international situation: the Tianjin Zhonghuan Computer Company is extremely cognizant of the current national encouragement of efforts toward cooperation with foreign interests. It has so far signed proposals for jointly funded enterprises together with the Japanese Epson Company, the American ISC Company, and the American CST Company. In addition, feasibility fabrication plans for joint ventures have been approved by relevant departments of the Tianjin Municipality government. They are trying hard to continue construction and to go into production with the aforementioned three companies this year and next. When all is ready, they will manufacture Epson printer heads, bank terminals, and VAX system minicomputers. This will raise the level of computer products in Tianjin yet another notch, and not only will these products satisfy international markets, but they will also compete in those markets.

Some of the rising new science and technology units in China, such as some institutes affiliated with the Chinese Academy of Sciences and the Northern Computer Company have strengthened relations with the Tianjin Economic Development Zone, and have successively established associated enterprises of particular and varied natures, and they are jointly putting a new face on the computer industry of Tianjin Municipality.

Briefs

First Fiber-Optic Computer Network--Shanghai's Wen Hui Bao newspaper will construct a fiber-optic computer network system in its news building--China's first such network. This high-efficiency network uses equipment that is all domestically made. A contract was signed recently with the three parties that will jointly construct the network: Shanghai Jiaotong University's Institute of Fiber-Optic Technology, the Shanghai Municipal Fiber-Optic Communications Engineering Company, and the Shanghai Cable Research Institute. Based on the CSMA/CD [carrier sense multiple access with collision detection] bus architecture, the network topology consists of a two-level distributed-control optoelectronic hybrid structure. The full network is composed of four fiber-optic-bus subnetworks and one [coaxial] cable-bus subnetwork (already in place). One fiber-optic subnetwork will be the backbone; the other three fiber-optic subnets will be connected to it through an optical-optical repeater, while the cable subnet will be connected to the backbone via an optical-electronic repeater. Twenty-nine workstations will have direct access to the network; this number is expandable. Subsystems include business management, data retrieval, news editing, automatic photographic composition, and telecommunications. This last subsystem can be tied into the Posts & Telecommunications trunklines or satellite communications lines for direct connection to the newspaper's printing plant and to reporters at the newspaper's offices in Beijing and Guangzhou. [Summary] [40080066a Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 41, 26 Oct 88 p 2]

Future of Galaxy Supercomputers--To date, the National Defense University of Science & Technology (NDUST) has installed three 100MIPS Galaxy supercomputers (YH-I): one at the university's headquarters, one at the Southwest Computing Center at Mianyang [Sichuan Province; see JPRS-CST-88-015, 12 Aug 88, p 53], and one at the Geophysical Prospecting Institute of the China National Petroleum & Natural Gas Corporation at Zhuo Xian [Hebei Province]. These three supercomputers, in continuous operation 24 hours a day, are charged with carrying out tasks involving high-volume data and complex data, and have created notable social and economic benefits for the cause of national economic construction. In order to satisfy the needs of different users, NDUST is currently developing the Galaxy Model II (YH-II), based on the Model I; this computer will be provided to the Beijing Meteorological Center of the State Meteorological Administration. The YH-II supercomputer will have higher performance and more functions, and is smaller in size. [Text] [40080066b Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 41, 26 Oct 88 p 18]

Voice-Controlled Computer Wins Prize--At a press conference held yesterday in Shanghai, Professor Guan Dinghua [7070 1353 5478], Director of the Chinese Academy of Sciences' Acoustics Institute, announced that his institute has developed a fifth-generation voice-controlled microcomputer, and that it was awarded a major prize this year at an international exhibition held in France. In contrast to earlier generation computers, which accept instructions from a manual keyboard, the fifth-generation computer accepts spoken commands. The institute's man-machine-dialogue computer, originally able to understand the dialect only of one [particular] master, can now--after much research and improvement--comprehend instructions spoken in Mandarin [putonghua]. The acoustics specialist added that this voice-controlled computer is currently in operation at the Hangzhou Post Office to sort mail. [Summary] [40080069d Shanghai JIEFANG RIBAO in Chinese 3 Nov 88 p 1]

First "Embedded" Chinese Software--The Shanghai Municipal Songhu [3247 3337] Computer Institute recently developed an embedded [qianru shi 1523 0354 1709] Chinese-language software environment which can gradually reduce and eventually even eliminate the processing disparity between Chinese and Western-language software, and which will fundamentally transform the question of compatibility between the two. The new design concept passed certification a few days ago in Shanghai. The designers had to "Sinicize" [i.e., convert to Chinese] high-level programs in order to produce software which can directly "translate" English-language software into Chinese in only a few hours to only a few days, depending on complexity of the original. This represents a great reduction in the amount of time hitherto required to Sinicize Western software. The new software system, developed on an IBM-PC/AT, has the following characteristics: (1) it can transform completely embedded PC-DOS operating systems for use in a Chinese DOS computer, and (2) it can without modification run several Western software programs, such as the well-known integrated compiling system Turbo Pascal and the newest relational database program Foxbase Plus. Other uses include high-level character processing, electronic data lists, graphics processing, and computer aided design. Rights to this system will be granted to the Changjiang Computer Association for broad dissemination to users. [Summary] [40080069e Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 43, 9 Nov 88 p 18; Shanghai JIEFANG RIBAO in Chinese 6 Nov 88 p 1]

Computerized Radar Fault Diagnosis--The People's Liberation Army's Ordnance Institute has developed a radar fault diagnosis system using the Sinicized expert system development tool CH.1 and the artificial intelligence language Turbo Prolog as basic support software. The system, which passed ministry-level accreditation in October 1988, can run on several kinds of microcomputer, such as the STM portable computer, the IBM-PC/XT and AT, and the Chinese-made Great Wall 0520CH and 286. With over 7Mbytes of programming space, this system contains over 2000 rules and incorporates such techniques as empirical decision, logical inference, fuzzy diagnosis, and forward-backward inference. Tested over a half-year-plus period, the system has proven stable and reliable, and has demonstrated a diagnostic agreement (conformity) rate of over 90 percent. [Summary] [40080086a Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 44, 16 Nov 88 p 2]

Market Demand, Capital Relatively Stable--Beijing, 10 Dec--According to information provided by the China Computer Market Network, the capital support power [zijin zhichi nengli] of China's computer market after three years of the Seventh 5-Year Plan is 8.33-12.5 billion RMB. In the first three quarters of calendar year 1988, gross output of microcomputers from the 36 main computer plants nationwide was 37,000, and the total number of microcomputers sold was 32,200. Gross output of mainframes, midis, and minicomputers was 220; of single-board computers, 7,700; and of Zhonghua learning computers, over 190,000. Predictions of experts for next year [1989] are that total sales of mainframes and midis will be 550, a 10 percent increase over 1987; total sales of microcomputer systems will be 75,000. Sales of learning computers and single-board computers will total 50 to 80,000, and 250,000 sets of computer peripheral equipment will be sold. Also predicted for 1989: Chinese-made mainframes, midis, and minicomputers will capture 35 percent of the market, and Chinese-made microcomputers will take up 67 percent. [Summary] [40080086b Beijing GUANGMING RIBAO [GUANGMING DAILY] in Chinese 11 Dec 88 p 1]

Causes Of, Policies To Solve Environmental Pollution Problems

40081005 Beijing XIANDAIHUA [MODERNIZATION] in Chinese No 9, Sep 88 pp 16-17

[Text] 1. China's Environmental Problems Are Extremely Serious

China is a large, developing socialist country. The population is expanding, so resources are relatively insufficient and there is a serious lack of funding. These are major contradictions and difficulties for economic development. Environmental pollution and ecological damage are also significant problems of development and major limiting factors. Between economic development and environmental protection exists a unity of opposites relationship. Historical practice confirms that if human social development and economic activity abide by natural and economic laws and the situation of the country, benefit can be obtained from nature. Also, the society, the economy, the population and the environment can be developed in coordination. If we do the opposite, nature will inevitably punish us and despite our haste, economic development will not be achieved. We may even destroy our own country.

Presently China's environmental problems, including ecological damage and pollution already resemble the population problem, in that they have become a "syndrome" which is very difficult to cure, containing and effecting smooth economic development.

China ranks among the countries which release the most pollution. Annually, 7 trillion cubic meters of air pollution and 34 billion tons of polluted water are released. Only 24.3 percent of industrial waste water and only 4 percent of municipal sewage is treated. Pollution from the pesticide, dye printing and paper industries is especially serious. Acid rain has caused inconceivable damage in the south. Industrial solid waste accumulation totals 7.4 billion tons, covering 1 million acres. Comprehensive renovation of the urban environment has just begun. Municipalities are distributing pollution in the rural areas. This, combined with development of pollution from village enterprises has impacted the large, weak rural ecology. According to statistics, gaseous and liquid waste and industrial residue from village enterprises

accounts for about 15 percent of the country's total pollution. Moreover, the capacity for control is low. In certain areas urban and rural environmental pollution have come together to create contamination over a large area which is difficult to bring under control.

In the wake of economic development and blind plunder of our natural resources, the ecological environment is becoming worse by the day. Forest resources are sharply decreasing. Every 5 years forest coverage is reduced by 0.9 percent. Cutting is out of control, every year the amount of logging is roughly twice that of forest growth. It is estimated that, possibly by the year 2000, the supply of cuttable, high quality timber and forest resources will be nearly exhausted. Following a worsening of damage to forest systems, is serious soil erosion. This covers 1.5 million square kilometers, about one-sixth of the country's total area. Annual soil loss is 5 billion tons. Losses in nitrogen, phosphorous and potassium equal one-half the nation's total production of chemical fertilizer. Because of destruction of forests and grasslands and excessive grazing, vegetation has been destroyed and soil desertification is spreading. Desertification increases by 1560 square kilometers each year. Salinization of cultivated areas has effected 100 million acres. Occupation or deterioration of agricultural land is serious and fertility is decreasing. Agricultural stamina is seriously inadequate as the land given over to low-level production increases year by year. Underproductive fields account for 30.4 percent of all cultivated land. The quality of grasslands that cover one-third of the nation's total area is deteriorating. Human and animal populations are on the increase in grazing areas. The grasslands ecological system is facing a situation of serious degradation. China's water resource crises is already extremely urgent. In the north and south, both critical shortages and excessive consumption exist simultaneously. Nation-wide the average usage per person is 2650 cubic meters, only one-fourth the world average. Municipalities have a daily water supply shortfall of 20 million tons. Due to water shortages, in 1986 alone, the economic damage in 100 cities was estimated at 20 billion yuan. In the countryside there were nearly 40 million people and 80 million animals effected by drinking water shortages. Approximately 300 million acres were threatened by drought. Mercury pollution in the Songjhuaiang River has already resulted in one case of methyl-mercury poisoning.

The daily worsening of environmental pollution and ecological destruction, in addition to population pressure and plunder of resources, constitute a barrier to China's economic development. China has already reached a point from which saving the environment is imperative.

2. Analysis of Causes of Environmental Pollution and Ecological Destruction

The major reasons why pollution and ecological destruction have reached this serious state include a low level of economic development, backward technology and weak environmental consciousness among the people

(especially the leadership). Thus, an irrational distribution of industry results during the process of socialist construction, resources are not fully utilized, and effort is not taken to manage the environment. The major manifestations of these problems are: 1) When managing the relationship between economic construction and the environment, too much emphasis is placed on the economic aspects and too little consideration is given to possible negative environmental effects. The environmental impact statements and the "San Tong Shi" [0005 0681 2514] system of many construction projects have not been vigorously executed, therefore, normal operation of environment protection facilities still can not be achieved. 2) When distributing industrial construction and production capability, we still can not adequately consider the functional demands of environmental capacity, the environment's ability to absorb stress and environmental diversity. Thus appears the phenomenon of pollution and ecological imbalance. 3) Production technology and equipment is backward, resources are not fully or rationally utilized, there is great waste of resources and energy, and pollution is serious. 4) Positive, effective ways still can not be found to escape from the poverty in poor, backward areas or to develop the local economy, protect resources and improve the environment in accord with local factors. This causes people, under the pressures of life, to denude timber and destroy vegetation. 5) The environmental consciousness of the people is weak. Awareness of the environmental crises among policy-makers is low. Some cadres are shortsighted in their behavior, therefore, they are only concerned with immediate profit and they neglect long-term planning. 6) The legal system is imperfect. Disregard for the law and lax enforcement are relatively common.

In brief, environmental problems are produced in the process of social economic development. The solution to environmental problems depends on social progress, economic development, elevation of science, technology and cultural levels and the strengthening of environmental consciousness. At the same time, it is necessary to lead people to awareness and continuous solution of all kinds of new environmental problems which arise during the process of reform and deregulation. Also, new policies to deal with this must be looked into.

3. Policy Suggestions

1) We should make a great effort to develop environmental education and cultivate personnel skilled in the scientific and technological management of environmental protection. The environmental awareness of all levels of leadership and the environmental consciousness of the people as a whole should be raised. Also, accurate views concerning resources and the environment should be established.

The business of environmental protection relies first on policy, secondly on S&T and thirdly on management. Policy is formulated by people, S&T must be mastered by people, management must be carried out

by people. Therefore, improving the quality of personnel is the foundation and the key to accomplishing the business of environmental protection. In China now, there are over 80 colleges and research institutes training specialists at all levels and in all fields of environmental protection. However, there are no places for training urgently required specialists in certain fields. In some other fields there exists an overabundance of personnel, exceeding the demand. The State Education Commission should strengthen overall control of environmental protection specialist training, formulate concrete methods and thoroughly implement stipulations in State Council document number 27 of 1981 "State Council Decision Regarding Strengthening Environmental Protection Work During The National Economic Adjustment Period" indicating that environmental science knowledge should be disseminated in primary and secondary schools. Universities and vocational schools should include environmental protection coursework in such fields as physics, engineering, agriculture, medicine, economics and law. Each region and each department when training cadres should include environmental protection as part of the curriculum.

Environmental protection is a great undertaking of a syncretic, interdisciplinary nature, which involves all aspects of natural science, social science and economics. The China Association of Science and the Social Sciences Union should continue to support and conduct, with the participation of national scholarly societies, joint interdisciplinary research in environmental protection science, in order to generate proposals for overall control of China's environmental protection policy decisions. The State S&T Commission should improve the leadership and management of environmental S&T research in the Eighth Five-Year Plan, to avoid repetition of low-level research and enhance the benefit from environmental science research. Propaganda departments at all levels and the Ministry of Radio, Cinema and Television, would improve the dissemination of environmental science education to raise the level of environmental morality and consciousness among the mass public and create accurate ideas about resources and the environment. the State Bureau of Environmental Protection should take measures to elevate the level of mass public participation in environmental management and supervision.

Through environmental education, new public ideas and concepts should be established, concerning correct handling of the contradictions between economic development and environmental protection, short and long-term interests and between interests of the part and of the whole, forming a prevailing attitude in society that environmental protection is everyone's responsibility.

2) Further improve the establishment of environmental management agencies.

Protecting the environment is the business of all the people, involving all enterprises and departments; therefore, the strength of the entire society must be mobilized to achieve the environmental protection work

which falls within each jurisdiction. China's 15 years of experience in environmental protection indicates that, in order to lead the environmental protection work of each region and each department well, it is necessary to strengthen the environmental protection supervision, management and coordination of the National People's Congress, all levels of government and especially the integrated departments.

The State Council's Environmental Protection Commission, the Environmental Protection Bureau and environmental protection organs at all levels within the people's government should be further strengthened organizationally. There is a particular need to strengthen environmental protection management personnel in municipal, county and grassroots government authorities, and in enterprises. The environmental protection capability of the Meteorology, Oceanography, Public Health, Industry and Agriculture Departments must be planned and coordinated in a unified way.

In September 1979 China issued "The Environmental Protection Law of the PRC" (trial). Later, six natural resources laws were issued which governed forests, grasslands, fisheries, mineral resources, land management and water. Also, the three environmental protection laws were issued which covered protection of the marine environment, atmosphere and water pollution prevention and treatment. The State Environmental Protection Bureau and the State Council's Legal Bureau should pay close attention to the revision and approval of environmental protection laws and the formulation of laws controlling environmental noise, solid waste management laws, nuclear pollution control laws, wildlife protection laws and other specific environmental legislation. Details of implementation should be worked out for those laws already issued and enforcement should be strengthened to perfect the legal system for protecting the environment.

3) All levels of municipal government should earnestly and thoroughly implement the State Council Environmental Commission's "Decision on Improving Integrated Renovation of Municipal Environments" of 10 October 1985 to further environmental protection work. All levels of government should earnestly and thoroughly execute the State Council's "Regulations Regarding Improving Environmental Management of Village and Neighbourhood Enterprises" (1984, number 135) to prevent the continued spreading of environmental pollution over whole areas.

4) "Essentials for Nature Conservation in China" is China's first relatively systematic, macroscopically oriented and programmatic guiding document. It is also an excellent teaching resource for disseminating knowledge about conservation science. It provides a systematic exposition of important conservation concerns, i.e., soil, biological, water, mineral and atmospheric basic conditions, major problems encountered in exploitation, and measures which should be adopted to deal with these problems. The special characteristics of China's diverse natural areas, problems in their exploitation and appropriate

solutions are also included. The conference suggested that the CPC Central Committee Propaganda Bureau and relevant departments of the State Council should hold a propaganda activity at an appropriate time, with study, propagation and implementation of "Essentials for Nature Conservation in China" as its major content, thereby, making conservation of the natural environment and natural resources a conscious activity of every citizen.

5) Suggestions for improving the forestry industry.

Because we lack a scientific and complete understanding of forestry, forestry concepts have become outworn. Sufficient understanding of the complexity, difficulty and social impact of China's forestry development, as well as appreciation of the major significance of forests in nature conservation is not present. Scientific operational planning does not exist regarding forest regeneration, multi-functionality and instability. All of this together has caused the current forestry resource crisis and the vicious cycle of problems in forestry economics. Therefore, we must ensure that departments responsible for policy-making in forestry and economics, and leading management departments possess a complete, scientific understanding of forestry. A very far-sighted, feasible and stable strategic development plan is required to consolidate and develop the resources of existing major forest areas. A compensatory charge should be imposed for forest damage and a maximum effort should be made to create high intensity planted forests. Forest management should be established in accord with models and management by objective should be put into practice, thus, changing "one-way exploitation" into "reasonable utilization." Funding problems in establishment of the industry need to be solved. Opportunities must be seized to adjust forestry policy so as to support the recovery and development of the industry.

6) Investment in environmental projects must be workable and environmental protection expenditures must account for a fixed proportion of national income.

China must adhere to and implement a strategic policy for simultaneous advancement of economic construction and urban, rural and environmental projects. China must also realize unification of economic returns with social and environmental benefits. Investment in environmental projects must be both guaranteed and practicable, occupying a substantial proportion of national income. International experience confirms that, in general, developed countries spend 1.5 to 2.0 percent of their GNP on environmental protection. Developing countries spend 0.5 to 1.0 percent. Based on the program put forward by the "China in the Year 2000" research organization, environmental protection funding, primarily for prevention and cleanup of pollution, should be 1.5 percent of GNP. Only then can basic control of environmental pollution be achieved. The State Planning Commission should implement environmental protection

funding in the "Eighth Five-Year Plan" and in its annual plans. Relevant ministries, commissions and bureaus of the State Council and the People's government of each region, should further implement the "Circular Regarding Environmental Protection Funding Channel Regulations" issued on 10 June 1984, by the Ministry of Urban and Rural Construction and Environmental Protection, the State S&T Commission, the State Planning Commission, the State Economic Commission, the Ministry of Finance, the People's Construction Bank of China and the National Industrial and Commercial Bank of China. Several of the environmental protection funding channels regulated in the circular have still not been fully opened. Moreover, funding for prevention and repair of ecological and environmental damage and for ecological and environmental projects has not yet been implemented. The Ministry of Finance should increase resource taxes and use the revenue to create a special account for the conservation of resources.

Cities Selected To Pioneer Pollution Control

40101005 Beijing XINHUA in English 1237 GMT 16 Oct 88

[Text] Beijing, October 16 (XINHUA)--China has designated 32 cities to pioneer a major effort to reduce air pollution, according to a decision of the Environmental Protection Committee of the State Council today.

The cities, which include Shanghai, Hangzhou, Suzhou, Kunming, Quanzhou, Xian, Beijing and Shenyang, are China's political, economic, cultural, scientific and tourist centers.

In another decision, the committee said environment assessment will begin in all Chinese cities starting from January 1, 1989. The assessment will cover 21 items in atmospheric and water conditions, noise control, waste disposal and afforestation.

The decisions were made in line with the Seventh Five-Year Plan and the government work report passed at the first session of the Seventh National People's Congress.

China Spends More on Pollution Control

40101004 Beijing CHINA DAILY in English 24 Oct 88 p 1

[Article by Wang Rong]

[Text] China will spend about 25 billion yuan on environmental protection during the seventh five-year plan, an increase of approximately 50 per cent over the expenditure during the last cycle.

Qu Ceping, head of the State Environmental Protection Bureau, said yesterday that this year's expenditure will be no less than last year's 7 billion yuan. China's expenditures in this area, he said, have been rising for the past several years.

Qu spoke at a news conference which preceded the Nordic countries-China Symposium on Environmental Science and Technology, opening today in Beijing.

He said the current efforts to strengthen the country's economy "actually have a good effect on environmental protection." The economic plan, he pointed out, leads to the reduction of high-energy consumption enterprises. These same enterprises also cause heavy pollution.

Qu said that the air pollution in Beijing is about 20 times more serious than in cities in developed countries because more than 900 tons of coal, 80 per cent of which is unwashed, are burned each year in Beijing. China probably is the biggest coal user in the world, he said.

Qu called air pollution "the most serious environmental problem in China". He said the best way to reduce air pollution is through "integrated treatment." Rather than designing efforts only to clean up the air, he suggested that as China concentrates on all environmental issues, as well as on industrial, residential, transportation and economic development, air pollution will decrease.

The factories causing heavy pollution in big cities or residential areas will be moved away, he said. In the last two years more than 10,000 such factories had been closed or moved.

Environmental Survey Reveals Acid Rain Pollution

40101006 Beijing XINHUA in English 1129 GMT 2 Dec 88

[Text] Beijing, 2 Dec (XINHUA)—A survey by China's 189 environmental monitoring stations has revealed that more than 2.6 million hectares of farmland is being polluted by acid rain.

Most of the land is located in Sichuan and Guizhou Provinces, the Guangxi Zhuang Autonomous Region in southwest China, Hunan Province in central China and Guangdong Province in south China, according to the survey.

Acid rain in China is mainly composed of sulphur dioxide discharged from the smokestacks of factories, refineries and smelters.

China's factories discharge an estimated 17 million tons of sulphur dioxide into the atmosphere annually, the survey said.

As a result, China loses 1.5 billion yuan a year from crop failure caused by acid rain.

Chinese environmentalists noted, however, that basic pollutants in north China, which are more than those in the south, have neutralized acid substances in the atmosphere, making the area relatively free of the problem.

They called for further research on potential acid rain damage to the environment in the future.

Theoretical Mode of Lifetime Measurement by Phase Shift Method

40090021a Shanghai GUANGXUE XUEBAO [ACTA OPTICA SINICA] in Chinese Vol 8 No 9, Sep 88 pp 769-775

[English abstract of article by Li Shifang [2621 0013 5364], et al., of Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences]

[Text] The lifetime of atoms and molecules can be measured using the modulated resonant single-mode laser field. A theoretical mode for this method is presented. It is shown that the laser-induced fluorescence, a resonance fluorescence, is modulated at the same frequency, but a phase shift involving the exciting laser occurs. The phase shift is mainly due to three processes: (1) the coherent excitation process characterized by the transverse relaxation rate and line width of the laser, (2) the population damping process characterized by the decay time of the excited levels and other populated levels, (3) the collision process characterized by the relaxation time by which the system is in the equilibrium state. The effect of these processes on the measured results is discussed. The Doppler broadening is also considered.

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Linear Conversion Theory of Second Harmonic Emission From Plasma Filament

40090021b Shanghai GUANGXUE XUEBAO [ACTA OPTICA SINICA] in Chinese Vol 8 No 9, Sep 88 pp 799-805

[English abstract of article by Tan Weihua [6223 4850 5060], et al., of Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences]

[Text] The linear conversion theory of laser-produced plasma filaments is studied in this paper. By calculating the energy flux of the second harmonic emission on the basis of the planar wave-plasma interaction model, it has been found that no $2\omega_0$ harmonic emission exists in the direction perpendicular to the density gradient, a contradiction to experimental results. Therefore, the authors propose a linear conversion theory on the second harmonic emission from a plasma filament and discover the intense $2\omega_0$ harmonic emission in the direction perpendicular to the density gradient. This is in agreement with experimental results.

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Space, Time Resolved Structure of Second Harmonic Emission From Microtube Targets at Backscattering Direction*

40090021c Shanghai GUANGXUE XUEBAO [ACTA OPTICA SINICA] in Chinese Vol 8 No 9, Sep 88 pp 806-810

[English abstract of article by Chen Wenhua [7115 2429 5478], et al., of Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences]

[Text] Reported in this paper are the space and time resolved structures of second harmonic emission from laser irradiated microtube targets observed at the backscattering direction. The laser-microtube interaction process is analyzed. By using the plasma-filament interaction theory, the authors explain the special phenomena involving the backscattering second harmonic emission within the microtube region.

* Project supported by the Science Foundation of the Chinese Academy of Sciences.

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Projection Rainbow Hologram

40090021d Shanghai GUANGXUE XUEBAO [ACTA OPTICA SINICA] in Chinese Vol 8 No 9, Sep 88 pp 824-831

[English abstract of article by Xie Jinghui [6200 2417 6540], et al., of the Department of Optical Engineering, Beijing Institute of Technology]

[Text] In this paper, a new recording technique for rainbow holograms--Projection Rainbow Holography--is proposed. With this technique, the recording process involving rainbow holograms is simplified. In addition, some limitations to the traditional recording technique are eliminated. Therefore, performances involving a large field depth, wide viewing angle and high resolution can be obtained. In this paper the projection rainbow hologram principle is presented, its basic performances are analyzed and some successful and possible applications are discussed.

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Beam-Splitting Techniques in Multichannel Optical Disk Memory

40090021e Shanghai GUANGXUE XUEBAO [ACTA OPTICA SINICA] in Chinese Vol 8 No 9, Sep 88 pp 838-843

[English abstract of article by Wu Zhen [0702 7201], et al., of the Department of Optical Engineering, Huazhong University of Science and Technology]

[Text] An analysis of multifrequency A-O deflections and a diffraction grating for multibeam-splitting techniques applied in optical disk storage is given in this paper. Based on the theory of binary computer-generated holograms, accurate periodic parameters of a phase grating which can generate equal-intensity multiple beams are obtained by using pulse position modulation in terms of a computer analog. According to the parameters, a phase grating has been fabricated by a special method. The phase grating has a total diffraction efficiency of 73 percent, with a maximum residual deviation of 1.75 percent from the average, which is sufficient for practical usage.

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New Method for Phase Correction in Fourier Transform Spectroscopy

40090021f Shanghai GUANGXUE XUEBAO [ACTA OPTICA SINICA] in Chinese Vol 8 No 9, Sep 88 pp 861-864

[English abstract of article by Fan Shifu [5400 0013 4395], et al., of the Department of Precision Instrumentation, Tianjin University]

[Text] A new method for the correction of the asymmetrical interferogram is presented. After one application of this new method, an asymmetrical interferogram will be absolutely symmetric so that the distortion of the complete spectrum will be corrected. The theory and experiments show that this new method is more efficient than other available phase correcting methods in Fourier transform spectroscopy.

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Variational Analysis of Cumulant Expansion in SU(2) Lattice Gauge Theory With Action Including Six-Link Loops

40090022a Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 5, Sep 88 pp 608-615

[English abstract of article by Li Wenzhu [2621 2429 6999], et al., of Zhejiang University, Hangzhou]

[Text] By using the cumulant expansion variational method, the authors study the SU(2) lattice action, including six-link loops, satisfying Symanzik's request. The average values of the plaquette and six-link loop up to the second order approximation are calculated. The authors' results are consistent with the Monte Carlo data.

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Second Order Pion-Nucleus Optical Potential, Double Charge Exchange Reaction

40090022b Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 5, Sep 88 pp 627-634

[English abstract of article by Zou Bingsong [6760 0393 2646], et al., of the Institute of High Energy Physics, Chinese Academy of Sciences, Beijing]

[Text] In the framework of the fixed-scatterer field theory, the authors construct the second order iso-elastic microscopic pion-nucleus optical potential by including two nucleon correlation. The double charge exchange reactions to the double isobaric analog state are calculated by using the authors' theoretical optical potential. For the incident pion energies ranging from 0 to 300 MeV, the s and p wave components are included in the πN amplitude.

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Systematic Analyses of Proton-Nuclei Scattering With Relativistic Microscopic Optical Potential

40090022c Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 5, Sep 88 pp 635-643

[English abstract of article by Ma Zhongyu [7456 0022 3768], et al., of the Institute of Atomic Energy, Beijing]

[Text] The relativistic microscopic optical potential of a nucleon above the Fermi sea based on Walecka's model is used to systematically analyze the proton elastic scattering from nuclei at energies below 300 MeV. It is shown that the experimental data of differential cross sections, analyzing powers and spin rotation functions are reproduced satisfactorily, except for those involving large angles. This simple model may be used in the nuclear transport theory and heavy ion collision study to take into account both nuclear medium and relativistic effects.

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Moment of Inertia in Interacting Boson-Fermion Model

40090022d Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 5, Sep 88 pp 644-651

[English abstract of article by Liu Yong [0491 1661], et al., of the Institute of Particle Physics, Huazhong Normal University, Wuchang]

[Text] The authors have constructed the intrinsic states and studied the moment of inertia of deformed odd-A nuclei in terms of the self-consistent cranking calculation for a system described by the interacting boson-fermion model (IBFM). An approximate analytical method for the energy spectrum is presented for general cases in which the IBFM Hamiltonian does not have dynamic symmetry. The rationality of this method is also discussed by taking the 153 , 155 , ^{157}Eu isotopes as examples.

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Measurements of Angular Momentum Effect of Fission Barrier

40090022e Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 5, Sep 88 pp 658-664

[English abstract of article by Chen Keliang [7115 0344 5328], et al., of the Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou]

[Text] The fission cross sections and evaporation residue cross section for $^{12}\text{C} + ^{209}\text{Bi}$ and $^{14}\text{N} + \text{Pb}$ reactions were measured with gold surface barrier silicon detectors and mica nuclear track detectors. The critical angular momentum l_{cr} was deduced from the measured evaporation residue cross section σ_{er} based on the sharp-off model. The fission barrier with particular angular momentum l has been derived from the condition $\Gamma_f/\Gamma_n = 1$ at $l = l_{\text{cr}}$, and the angular momentum effect of the fission barrier has been studied experimentally.

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Exploration of Optimum Shape in Symmetry Fission

40090022f Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 5, Sep 88 pp 669-672

[English abstract of article by Dai Guangxi [2071 0342 2569], et al., of the Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou]

[Text] In this paper, the large deformation of symmetry fission is described by a biquadratic surface revolution instead of several quadratic equations. Based on the standard liquid drop model, varied calculations of deformation energy are performed, obtaining a better shape with a coefficient group (bi) than the Cassinian ovaloid. The shape with (bi) has lower deformation energy than that of the ovaloid at the same separation distances between CM of the half bodies. The so-called optimum II with (bi) can generally be used in the mass range of 200-300. The fission barrier for optimum II is lower and thinner than that of the ovaloid since, after the saddle point, the potential descends more quickly. The saddle point is slightly pressed for the optimum II shape. There are significant differences in deformation energy between the optimum II shape and the ovaloid when a neck appears in the middle. The neck cross section of the optimum II is larger than that of the ovaloid before the scission point is reached, and equal or thinner near the point.

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Systematic Calculations of (n, 2n), (n, 3n) Reaction Cross Sections for Medium-Heavy Nuclei at 14.5 MeV

40090022g Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 5, Sep 88 pp 683-688

[English abstract of article by Yao Lishan [1202 4539 1472] of Lanzhou University; Zhou Enchen [0719 1869 5256], et al., of the Institute of Atomic Energy, Beijing]

[Text] The (n, 2n) and (n, 3n) reaction processes have been studied by mechanism analysis of the neutron-induced nuclear reactions, and formulae for evaluating the reduced cross sections are given. The cross sections of 14.5 MeV (n, 2n), (n, 3n) reactions have been calculated according to the systematic method for $Z = 58-83$ about 53 nuclei. Good agreement between the results of the systematic calculations and the experimental data has been reached.

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Seniority, K-Structure of Cranked Shell Model Wave Function. I. Even-Even Nuclei

40090022h Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 5, Sep 88 pp 689-696

[English abstract of article by Lin Chunzhen [2651 4783 6966], et al., of Beijing University]

[Text] With increasing the rotational frequency ω , the seniority V-structure and the K-structure of the cranked shell model wave function become very complicated. When ω is not too high ($\hbar\omega \leq 0.5$ MeV), configurations with $V = 0, 2, 4$ are dominant for the low-lying bands, while those with $V \geq 6$ are negligibly small. Configurations with various K-values ($|K| \leq 10$) are comparable, and the nucleus deviates significantly from the axial-symmetry. The variation of the gap parameter with ω is analyzed also.

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Programmable Phased-Array-Radar Signal Processor Developed

40080073 Beijing DIANZI XUEBAO [ACTA ELECTRONICA SINICA] in Chinese Vol 16 No 5, Sep 88 p 102

[Unsigned article: "General-Purpose Programmable Radar Signal Processor Passes Accreditation"]

[Text] A multifunctional all-digital programmable radar signal processor, developed at Qinghua University's Radio Department for use in all-solid-state three-coordinate phased-array radar [xiang kong zhen 4161 2235 7109], passed the ministry-and-commission-level technical certification held by the State Education Commission on 30 June 1988. The signal processor has the following characteristics:

1. Full Range of Functions. The signal processor's main components include variable-pulse-number [maichong shu kebiande] adaptive [moving] target indication (AMTI), digital pulse compression (PC), a moving target detector (MTD), digital integration [jilei 4480 4797] (DI), a constant false-alarm [rate] processor (CFAR), and other parts. The digital moving target [indicator] incorporates staggering of the [pulse] repetition frequency [cenci bian chongfu pinlü], time-varying weighting [shi bian jiaquan], and variable-notch weather-clutter and ground-clutter suppression [kebian aokeu kang qixiang zabo he di zabo]. The digital pulse compression uses FFT [Fast Fourier Transform] and IFFT [Inverse Fast Fourier Transform] to implement fast convolution, and has a pulse-interval agile compression ratio capability [mai jian jiebian yasuo bi de nengli]. The moving target detector utilizes an optimally designed FIR [Finite Impulse Response] filter bank. The CFAR processor can perform noise, weather, and clutter-chart constant false-alarm [rate] processing. In addition, the system also contains BITE [built-in test equipment] for fault diagnosis of the circuit boards; this provides for a maintainable system. This [entire] processor has almost all the main signal processing functions incorporated in modern advanced radars, and is quite universal.

2. Flexibility and Adaptability. The signal processor has a total of six different operating modes:

- (1) AMTI + CFAR
- (2) PC + CFAR
- (3) AMTI + PC + CFAR
- (4) AMTI + MTD + CFAR
- (5) AMTI + PC + MTD + CFAR

(6) AMTI + PC + DI + CFAR

3. Programmability. All the parameters of the various operating modes are programmable:

(1) For AMTI, the three-pulse MTI has five range selections [juli duan], each with eleven notches; the four-pulse MTI has three range selections that can be chosen; and the six-pulse MTI has five notches that can be chosen.

(2) The PC operating mode has six different durations [shi kuan], bandwidths, and compression ratios. Compression ratios are: 32, 64, 256, and 512. In addition, there is a frequency diversity [fenji 0433 7162] mode.

(3) The MTD operating mode has three FIR filter banks: 4-, 6-, and 8-step.

(4) The integration pulse numbers in the noncoherent integration mode [fei xiangcan jilei fangshi jilei maichong shu] are: 2, 4, 6, 8, and 16.

4. Advanced Performance. Average improvement factors [gaishan yinzi] with respect to ground clutter and weather clutter are: greater than 53dB and greater than 40dB, respectively; pulse compression sidelobe leveling is less than -40dB.

5. High Processing Speed. Very high operating speeds are attained via use of the clever FFT algorithms, a MIMD [multiple instruction stream, multiple data stream] construction, and high-speed CMOS multiplier/accumulators [chengfa lei jiaqi]. The operating speed of the entire processor is as high as 1148 MIPS [million instructions per second]. Time required for a 1024-point complex number FFT: 520 microseconds.

6. Small Equipment Quantity. A complete processor has a total of 250 circuit boards in 15 types.

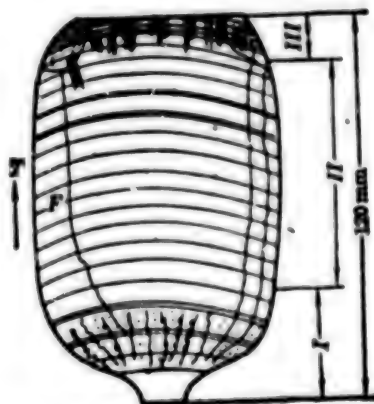
Experts and professors unanimously agree that this signal processor is the most advanced in China, meets advanced international standards, and has broad value for popularization and application.

Perfection, Laser Performances of Nd:YAG Crystals Grown by Temperature Gradient Technique

40090020a Shanghai ZHONGGUO JIGUANG [CHINESE JOURNAL OF LASERS] in Chinese
Vol 15 No 9, 20 Sep 88 pp 522-527, 521

[English abstract of article by Deng Peizhen [6772 0160 3791], et al., of Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences]

[Text] The formation and development of defects in Nd:YAG crystals grown by the temperature gradient technique (TGT) have been studied systematically using different methods. According to the defect deformation mechanism, the high quality area within crystal boules can be enlarged noticeably after reasonable modification of the growth parameters. Single transverse mode and single longitudinal mode laser output have been obtained easily from high dopant (Nd O 1 wt percent) and high optical homogeneous laser rods. However, the effect of interference fringe distortion due to the growth striae in the crystal on the beam quality from the disk laser and the laser threshold still need to be improved.



Pattern of Defects in Nd:YAG Crystal Grown by Temperature Gradient Method

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Non-Fourier Thermoelastic Response to Laser Impact on Target

40090020b Shanghai ZHONGGUO JIGUANG [CHINESE JOURNAL OF LASERS] in Chinese
Vol 15 No 9, 20 Sep 88 pp 537-543

[English abstract of article by Yuan Gang [5913 6921], et al., of the Department of Modern Mechanics, University of Science and Technology of China, Hefei]

[Text] Starting from a modified Fourier heat conduction law, the propagation law of thermal shock waves produced by laser light on a one-dimensional semi-infinite medium is discussed. Analytical expressions are obtained on short- and long-time approximations. The short-time approximate solution represents non-Fourier behavior, while the long-time approximate solution degrades into a thermal coupled wave solution in the classical heat conduction law.

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CPA Calculation of LMT0 Band Structure for Tetrahedral Bond Semiconductor Alloys

40090023a Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese Vol 37 No 10, Oct 88 pp 1585-1592

[English abstract of article by Wang Renzhi [3769 0088 2535], et al., of the Department of Physics, Xiamen University]

[Text] A new approach for the CPA treatment of the band structure of semiconductor alloys based on the LMT0-ASA-VCA method is suggested in which no adjustable parameter is needed. In order to construct a set of orthonormal sp-like hybrid orbitals from the calculated eigenstates and apply them to CPA calculations, it is found that the following procedure is appropriate: During the LMT0 calculation and its VCA treatment, d states of atoms should be included in the matrix elements and the d-band hybridization effect may be regarded as negligible for the secular equation calculation. This method is illustrated with GaAlAs alloys. The results indicate that the CPA calculated values of bowing parameters of bands and band-edges are quite reasonable.

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Quantum Theory of Faraday Magneto-Optic Effect in Paramagnetic Media

40090023b Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese Vol 37 No 10, Oct 88 pp 1626-1632

[English abstract of article by Liu Gongqiang [0491 0361 1730], et al., of the Department of Applied Physics, Shanghai Jiaotong University]

[Text] In some paramagnetic media, the effective field H_i , which includes the exchange interaction and external magnetic field, can cause the ground state energy level to split. In the region of temperature $T > T_c$, the Curie temperature, a certain probability distribution of electrons exists on two energy levels arising from ground state splitting. This induces the ground state energy level involving double transition. It has been prove. by calculations based on this theory that several temperature characteristics exist involving the magneto-optical Faraday effect of the paramagnetic media. When the external magnetic field is not too high, the ratio of the Verdet constant to magnetic susceptibility χ is $V/\chi = A(1+BT)$ in some media, and $V/\chi = A(1+B/T)$ in other media. It is also shown that both the real part θ' and the imaginary part θ'' of Faraday rotation are proportional to the effective field H_i , and have similar temperature characteristics beyond the range of optical absorption.

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Study of Carburizing, Boronizing by Laser Irradiation--Their Strengthening Mechanism

40090023c Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese Vol 37 No 10, Oct 88 pp 1646-1651

[English abstract of article by Zheng Kequan [6774 0344 0356], et al., of the Department of Physics, Lanzhou University]

[Text] In this paper, experimental procedures are presented to carburize and boronize a 20 steel surface using a CW CO₂ laser with an output power of 500-2000 W modulated CW. The authors also give a comprehensive analysis of the phase structure, phase morphology, the distribution profile of the hardness and the resistance to abrasion of the sample after laser treatment. The experimental results indicate that the microstructure, mechanical properties and the chemical composition in the surface layer of the material will basically change. A preliminary discussion of the strengthening mechanism of the penetrating element by laser irradiation is also presented.

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Elimination of Pump Depletion in Laser-Plasma Beat-Wave Accelerators

40090023d Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese Vol 37 No 10, Oct 88 pp 1652-1657

[English abstract of article by Ma Jinxiu [7456 6930 4423], et al., of Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences]

[Text] Pump depletion is a severe problem preventing the laser-plasma beat-wave accelerator concept from being practical. Starting with the weak relativistic equation of beat-wave excitation of electron plasma waves, the authors have derived the condition to eliminate the pump depletion in a frame moving with the light pulse for arbitrary pulse shapes. It is shown that the depletion can be eliminated by a phase jump of π at the center of the pump pulse and by the appropriate choice of initial plasma density detuning. The numerical calculations yield the dependence of the initial detuning on the pump intensity for square pump pulses, and support the methods used in this paper.

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Investigation of Laser-Produced Plasma Using Multi-Frame Optical Probing Diagnostics

40090023e Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese Vol 37 No 10, Oct 88 pp 1658-1663

[English abstract of article by Jiang Zhiming [3068 1807 2494], et al., of Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences]

[Text] In the six Nd:glass laser facilities, a multi-frame optical diagnostic system with a $0.63\ \mu\text{m}$, 50 ps (FWHM) probing beam is set up. The authors use this system to investigate the states of laser-produced plasmas by means of simultaneous measurements of interferometry and shadowgraphy or Faraday rotation. The authors have also used five-time-frame interferometry or shadowgraphy and streaked shadowgraphy in their experiments. Such results as electron density profiles and their evolution, inhomogeneous plasma jet structure and a self-generated magnetic field have been obtained.

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Experimental Observation of Laser Driven High Pressure Shock Waves

40090023g Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese Vol 37 No 10, Oct 88 pp 1690-1693

[English abstract of article by Gu Yuan [7357 2266], et al., of the Institute of Engineering Physics, Shanghai]

[Text] This paper presents the experimental records of the light emitted from heating luminescence at the back surface of aluminum foil or stepped targets obtained by an optical ultrafast speed streak camera. The target was irradiated by a focused high power laser beam with 500 J output energy in a 1.2 ns FWHM pulse. The results show that the degree of flatness of the laser driven shock wave has been obviously improved due to the application of the special combined lens. In these experiments, the shock wave velocity in the step of the aluminum target is obtained as 17.6 m/ns, corresponding to a shock wave pressure of 4.4 Mbar.

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Theory of FELs with Helical Pump Field

40090026a Shanghai ZHONGGUO JIGUANG [CHINESE JOURNAL OF LASERS] in Chinese
Vol 15 No 10, 20 Oct 88 pp 581-585

[English abstract of article by Gou Sankui [5384 0005 1145] of the Physics
Department, Lanzhou University]

[Text] An effective procedure to solve the equation is derived by starting from the classical dynamic equation of relativistic electrons. The gain curve obtained here is remarkably different from that obtained previously. It was also found that the saturated laser field is directly proportional to the square of the initial electron energy and inversely proportional to the wiggler field, which comprises the new results of this paper.

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Stable 33W Average Green Light Obtained With KTP-Crystal As Intracavity Frequency Doubler

40090026b Shanghai ZHONGGUO JIGUANG [CHINESE JOURNAL OF LASERS] in Chinese
Vol 15 No 10, 20 Oct 88 pp 586-589

[English abstract of article by Huang Chaoen [7806 2600 1869], et al., of the Research Institute of Synthetic Crystals, State Administration of Building Materials, Beijing]

[Text] A 6.5 W CW green light has been achieved in a Nd:YAG laser by using the KTP crystal grown by an improved flux technique in the authors' institute as an intracavity frequency doubler. An average output of 33 W at 532 nm has been demonstrated when an acousto-optical Q-switch operating at 25 kHz was used. The stability of the KTP doubler was also checked.

New e-o Waveplate Reported

40090026c Shanghai ZHONGGUO JIGUANG [CHINESE JOURNAL OF LASERS] in Chinese
Vol 15 No 10, 20 Oct 88 pp 590-592, 589

[English abstract of article by Li Ruiyong [2621 3843 6978], et al., of
Shanghai Institute of Laser Technology]

[Text] A new e-o waveplate is reported. Compared with ordinary e-o modulators, this device can control not only the phase difference between the o- and e-beams, but also the direction of the main axis of the waveplate, i.e., it can change the ratio of amplitude of the o- and e-beams. Therefore, any polarization state can be obtained from one state of polarization using this device. It can also be used as an e-o rotator.

Effects of Beam Quality of XeCl Excimer Laser on Raman Conversion Efficiency in H₂

40090026d Shanghai ZHONGGUO JIGUANG [CHINESE JOURNAL OF LASERS] in Chinese Vol 15 No 10, 20 Oct 88 pp 598-601

[English abstract of article by Lou Qihong [2869 4388 3163], et al., of Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences]

[Text] SRS characteristics in high pressure H₂ are evaluated for pumping lasers with stable, plane-parallel and unstable laser resonators. By using a ring aperture to select the portion of the laser beam offering the best beam quality, greater than 90 percent Raman photonconversion efficiency was obtained with a pumping energy of 40 mJ.

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New Method for Judging Multistate Object Simultaneously

40090026e Shanghai ZHONGGUO JIGUANG [CHINESE JOURNAL OF LASERS] in Chinese
Vol 15 No 10, 20 Oct 88 pp 634-636

[English abstract of article by Chen Yan [7115 7346] of the Applied Physics
Department, Beijing Polytechnic University]

[Text] The direction of off-plane displacement resulting from any complicated deformation can be judged by introducing additional off-plane and vector analysis into holographic interferometry. The value and direction of the relative off-plane displacement between any two changes of various states of a sequentially deformed object in different intervals can be observed simultaneously on a single holographic plate by combining this method with multiplexing holography.

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New Method for Measuring Ocean Waves From Seasat SAR Remote Sensing Image

40090033 Beijing DIANZI KEXUE XUEKAN [JOURNAL OF ELECTRONICS] in Chinese
Vol 10 No 6, Nov 88 (manuscript received 2 Sep 87, revised 24 Dec 87) pp 507-512

[English abstract of article by Sun Jingsheng [1327 0079 3932] and Liu Zhengkai [0491 2398 0418] of the Radio Dept., China University of Science & Technology, Hefei]

[Text] A new method for measuring ocean wave length and direction from Seasat synthetic aperture radar (SAR) remote sensing image is presented. In the method, an ocean wave image is sampled in certain directions; the samples are then analyzed by using one-dimensional Fourier transform to calculate the ocean wave correlation function. Finally, the ocean wave length and direction are determined from this function. The method is better than the traditional two-dimensional Fourier transform method in both time consumed and precision.

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Computer Simulation of Thin Film Growth and Interface Structure

40090030b Beijing RANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese Vol 9 No 6, Nov 88 (manuscript received 4 Sep 87) pp 586-595

[English abstract of article by Tian Minbo [3944 3046 3134] et al. of the Department of Engineering Physics, Qinghua University, Beijing]

[Text] Some of the processes involved in thin-film nucleation and growth are discussed. Some phenomena presented in homogeneous and heteroepitaxial growth are also investigated. By means of computer simulation, the interface potential, interface distortion, and interface defects are specially emphasized. The surface morphology of vapor-deposited and LPE [liquid phase epitaxy] films is demonstrated by computer simulation. A comparison and verification of this work with the experimental results are also made.

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Electronic Structures of Strained Layer Superlattices $(\text{Si})_{2n}/(\text{Si}_{1-x}\text{Ge}_x)_{2n}$ (100) with $n=1\sim 10$

40090030c Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese Vol 9 No 6, Nov 88 (manuscript received 9 Jul 87) pp 604-613

[English abstract of article by Shen Dingli [3088 0002 4539] and Zhang Kaiming [1728 7030 2494] of the Physics Department, Fudan University, Shanghai]

[Text] The empirical LCAO [linear combination of atomic orbitals] tight-binding method is used to calculate the electronic structures of type-II strained layer semiconductor superlattices $(\text{Si})_{2n}/(\text{Si}_{1-x}\text{Ge}_x)_{2n}$ with $n=1\sim 10$ formed by lattice mismatched constituents Si and Ge. The energy gaps and conduction-band minimum positions are obtained for various layer number n . The effects of lattice-constant variation on nearest neighbor interactions are taken into account. The effects of band folding and band discontinuity on the Si/Ge gap are also analyzed. The 2DEG localized in Si layers can be explained in the formalism based on the change of conduction band offset from $\Delta E_c < 0$ to $\Delta E_c > 0$, which is induced by structural strain. The strained band agrees well with the photo-emission experiment and other calculations. Finally, hole effective mass and interface states are discussed.

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Briefs

GaAs Very-High-Speed ICs Developed--Four gallium arsenide (GaAs) very-high-speed integrated circuits (VHSICs) developed by the Ministry of Machine-Building & Electronics Industry's Research Institute 13 underwent ministry-level product design finalization certification on 26 December [1988] in Shijiazhuang city. Only a very small number of developed countries--which started their research in the seventies--have been able to produce these ICs in quantity beginning in 1984. GaAs digital VHSICs are used in superminicomputers, high-capacity fiber-optic and digital microwave communications, aerospace technology, radar, electronic countermeasures, and other high-speed electronic systems. Beginning its research on GaAs VHSICs in the early eighties, Institute 13 has previously perfected prototype circuits such as a GaAs very-high-speed frequency divider, a D flip-flop, a ring oscillator, and others. The four new circuits, which utilize advanced technologies such as ion implantation and which will be put into production as soon as possible, are a three-input NOR gate, a three-input NAND gate, a four-input AND/NOR gate, and a two-input exclusive OR gate. The gating delay times have reached values that meet international standards of the mid eighties. [Summary] [40080108c Beijing GUANGMING RIBAO [GUANGMING DAILY] in Chinese 29 Dec 88 p 1]

High Tc Superconductivity in Ba-Nd-Cu-O

40100020 Hefei ZHONGGUO KEXUE JISHU DAXUE XUEBAO [JOURNAL OF CHINA UNIVERSITY OF SCIENCE AND TECHNOLOGY] in Chinese Vol 18, No 3, Sep 88 pp 400-402

[Article by Xia Jiansheng, Fang Minghu, He Zhenhui, Wang Shunxi, Zhao Yong and Zhang Qirui, Department of Physics; Liu Fei, Qian Yitai, Zhao Huiqing, Pan Guoqiang and Chen Zuyao, Department of Applied Chemistry]

[Text] Since the discovery of high Tc superconductivity in La-Ba-Cu-O system¹, great progress in research on high Tc superconductivity in oxides has been made. Up to now, almost all rare earth elements have been substituted systems except Ba-(Ce, Pr, Tb)-Cu-O are found to be superconductors which annually have much higher Tc than in La-Ba-Cu-O. Many experimental results showed²⁻⁵ the superconducting transition temperature in systems which contain heavy elements of lanthanide, such as Ho, Dy, Er, Tm, Yb, Lu are usually higher than that in systems which contain light elements of lanthanide, such as La, Nd, Sm. But according to the theoretical calculation⁶, the high Tc superconductivity is mainly related to the proximity of competing charge density wave instabilities and the large electron-phonon matrix elements of the Fermi level electrons; that is, the proper structure is important for the high Tc superconductivity. It is known that the K_2NiF_4 --type compounds Ba-La-Cu-O are of Tc near 30K, but compound $La_{3-z}Ba_{3+z}Cu_6O_{14+8}$ are Tc~90K⁷. That gives us an idea that the light elements of lanthanide can also have a Tc near 90K if the proper structure is formed in it. In this paper, we report the Tc above 90K in Nd-Ba-Cu-O system, which is the highest Tc that has been reported so far in this system.

Samples with nominal composition of $Ba_{0.6}Nd_{0.4}CuO_{3.7}$ were prepared by combining stoichiometric proportion of $BaCO_3$, Nd_2O_3 , and CuO, and by heating the mixture at 900°C for 10 hours in air. Then, the mixture was reground and pressed into a bar and sintered at 960°C -1030°C in air for 7-10 hours. The X-ray powder diffraction shows that the samples are with several phases, such as $A_2BC_3O_{7-8}$, K_2NiF_4 or/and others, but the main phase is $NdBa_2O_{7-8}$.

Electrical resistivity measurements were performed by a standard D.C. four probe technique. The resolution of the voltage measurements is $1 \times 10^{-8}V$.

The A.C. magnetic susceptibility was measured by using mutual inductance bridge. During the measurement, both the samples and the thermometer kept good thermo-contact with the copper lump. The temperature was monitored by a calibrated copper-constantan thermocouple and a calibrated Ge-resistance thermometer.

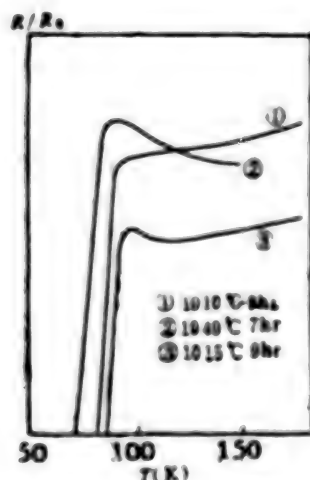


Fig. 1 Temperature dependence of resistance in Ba-Nd-Cu-O

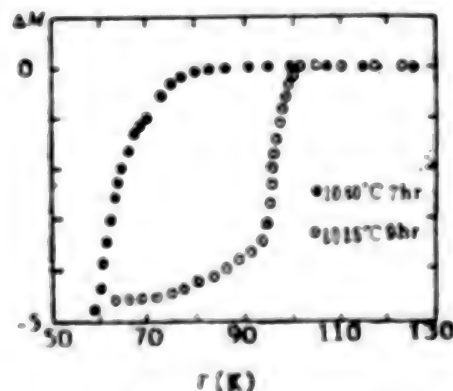


Fig. 2 A. C. magnetic susceptibility of Ba-Nd-Cu O

The temperature dependence of the resistivity of $\text{Ba}_{0.6}\text{Nd}_{0.4}\text{CuO}_{3.7}$ is shown in Fig. 1. A typical superconducting transition was observed. It is obviously seen that the electronic transport properties in the normal state, as well as in the superconducting state are very sensitive to the synthesizing condition. As it has been found in other system⁸, there is an optimal annealing condition for the superconductivity of the samples with given composition. The highest T_c for the samples measured, was observed in the sample which was preheated at 900°C for 10 hours and sintered at 1050°C. The T_c (mid.) = 89.5K, T_c ($\rho = 0$) = 84.0K, ΔT_c = 6K.

The A.C. magnetic susceptibility of the samples is shown in Fig. 2. A typical superconducting transition appears in the temperature corresponding to the midpoint of transition in $R(T)$ curves. In comparison with the single phase sample of $\text{Ba}_2\text{YCu}_3\text{O}_{7-8}$, the diamagnetic susceptibility signal is smaller and the transition width is larger.

From the above results, it can be seen that the Nd-Ba-Cu-O indeed has high-temperature superconductivity with T_c near 90K. And the results also show that for the same structure of Ba-Re-Cu-O, the differences of superconducting transition temperature between them are not obvious where Re is rare earth elements except Ce, Pr and Tb. That suggest that the proper structure should be very important for the high T_c superconductivity. For the lighter elements of lanthanide, such as Ce, Pr, if a proper structure can be found, the Ba-Ce(Pr)-Cu-O system might have high T_c . On the other hand, Nd is cheap in price and possesses a potential value for applications. The detailed study on physical properties in normal state, as well as in superconducting state are being carried out and it will provide some information for understanding the high T_c superconductivity in these oxides.

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Possible High- T_c Superconducting Mechanism

40090023f Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese Vol 37 No 10, Oct 88 pp 1664-1667

[English abstract of article by Feng Shiping [7458 0013 1627] of the Department of Physics, Institute of Low Energy Nuclear Physics, Beijing Normal University; Ma Senkun [7456 2609 1024] of the Department of Physics, Beijing Normal University]

[Text] Using the Anderson lattice Hamiltonian, the authors discuss the superconducting mechanism of high- T_c superconductors. The results show that the superconductivity may be induced by the hybrid Cooper pairs of electrons between the two bands of localized and delocalized states due to strong correlations of electrons in the band of the localized states.

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Survey of Current Posts, Telecommunications Information Systems

40080051 LIAOWANG in Chinese No 39, 26 Sep 88 pp 8-9

[Article by Chen Hongyi (7115 1738 3015): "The Call of the Information Age"]

[Text] We Must Open Up More Avenues of Funding

It is one thing for the state to increase funding, but as we look at the current feasibility, with the appearance of each measure of restructuring in the state, we can see that the state will not be able to greatly increase its share. Statistics show that in the investment structure of the Ministry of Posts and Telecommunications, the proportion of funding by the state has dropped from the 35 percent of 1986 to 19.4 percent in 1988, while self-generated funding for the same period (including funds from subscribers) has increased from 47.7 percent to 66.4 percent. For this reason, if we are in a situation where basic expenses for the Ministry are lower while still operating under a small profit and we still desire to hasten the growth of communications, we must continue to strive for state funding to ensure the construction of main lines of national communications; then we would primarily rely upon local support and enterprise contributions to resolve problems, including the secondary lines of provinces within the communications facilities of the interior. This has already become an important channel of funding, and in this regard, several provincial and municipal bureaus in Guangdong and Fujian, as well as the Shanghai Economic Cooperation District, have had much successful experience and have developed many methods.

At the beginning of the liberalization, there were only some 90,000 local service telephones throughout the entire province of Guangdong, fewer than 1,000 long distance lines, and even the communications facilities in cities of the three special zones were seriously inadequate. Consequently, in a 9-year period, the newly added communications capacity throughout Guangdong Province exceeded the totals for the previous 30 years. Local service telephones grew from 90,000 to 400,000, more than four times what had been. Local service dialing capacity increased dramatically as annual installation of

telephones increased from 606 subscribers to 80,000. Rural phones increased from 150,000 to 300,000. Long distance circuits grew from an insufficient 1,000 to 6,500, an increase of more than six times. Production capacity of the communications administration and its level of service have also had significant improvements.

Why has Guangdong grown so quickly? The key lies in the fact that they have resolved the problem of funding in a better way. They have implemented multiple-channel funding, where in 9 years the scale of fixed-assets funding of posts and telecommunications throughout the province has reached 1.4 billion yuan, within which 530 million yuan was self-generated, 200 million was allocated by the state (including funding by loans), 320 million was in the form of bank loans, 76 million yuan was from foreign sources, 35 million yuan was support from local governments, and 230 million yuan was raised through initial installation fees for local urban service. This figure is more than twice the total investment of fixed assets from all departments throughout the province during the 30-year period from 1949 through 1978. Boldly using bank loans and foreign funds and taking the route of "borrowing money to buy hens, then paying back the money after the eggs are laid" has been one successful experience for Guangdong. Over the past 9 years, their use of bank loans and low-interest foreign funds for construction have all been measures urgently needed for communications, and are measures that are economically sound. By going this route, they have won time for construction, have disseminated technological advances, and have gained obvious economic results. The 2,700-circuit microwave network from Guangzhou through Shenzhen to Hong Kong, the 1,800-circuit microwave network from Guangzhou to Shantou and Haikou, the digital microwave network within Hainan Island, and the stored-program-controlled (SPC) telephone [exchange] and mobile communications in Guangzhou Prefecture were all built using foreign funding.

The experience of Fujian has been one of little expenditure but much accomplishment, which has allowed limited funds to generate even greater results. Lin Jinquan [2651 6855 3123], director of the Office of Management for the Province Posts and Telecommunications, told us that for the limited funds to play an even greater role, they adopted a policy throughout their building efforts of the "utmost economy." First, they worked diligently on feasibility studies for import projects during which they maintained the principle of things being "advanced, suitable, reliable, timely, and as economical as possible" to determine optimum plans. As for example when they brought in the Xiamen to Nanping optical cable, which had to pass repeated experiments by experts, for which they chose the best circuits, and on which they saved 1.4 million yuan. Second, they overrode departmental boundaries, developed lateral associations, and thereby saved money. The 960-circuit microwave network from Nanping to Zhangzhou required an investment of 17.4 million yuan, but it was built together with the electric power system, some of the equipment was paid for individually, and 40 percent of the total expenditure was paid for by the provincial department, while the remaining 60 percent was funded outside the

department. The equipment is to be maintained by the department. This not only saves a great deal of money, but will also generate an annual income from maintenance fees. Third, they continue to promote investment responsibility and bidding systems. Fourth, they have done well at the reuse of fixed assets and have made the most of the potential equipment. After the Xiamen SPC telephone system went on line, they moved the now surplus crossbar system, over to Quanzhou to expand its capacity; after the Quanzhou SPC telephone system went on line, that same crossbar system was transferred to use in county exchanges; and after expansion of the capacities of the Fuzhou SPC system, the Model 47 exchanges that had been thereby become surplus were also transferred for use in county exchanges in the mountainous areas.

If we compare 1987 to 1979, there has been a 200 percent increase in exchange capacity for local urban service throughout Fujian Province, where the capacity of automatic exchanges has doubled three times (i.e., octupled) and where the proportion of automatic exchanges has risen from 9 percent to 49.2 percent; long distance lines have increased from 696 to 2,210, and the average number of lines at the capital or prefectural (municipality) level has increased from 6.6 to 44.9, which has opened up dedicated lines from the provincial capital to each county; automatic exchanges have progressively shifted to automatic and semi-automatic exchanges from the completely manual exchanges, so that throughout the province 83.6 percent of counties and cities enjoy completely automatic long-distance service or semi-automatic connections from point to point.

Telecommunications has also grown rapidly in Jiangsu Province. Since the 3d Plenary Session, the urban and rural telephone systems have grown by 210 percent and 100 percent, respectively. Eleven provincial and directly administered municipalities have instituted direct dialing for nationwide long distance. As for the problem of deficiencies in funding for future growth, the provincial government acted on its own to convene a meeting of mayors from more than 20 cities, which then formulated corresponding policies. These are currently being actively implemented. The methods used by Jiangsu have broad significance, and several other areas are learning from them.

The actual experiences of these provinces have been quite illuminating. If other regions can do likewise, there need be no worry that new ways will be found to hasten the development of communications.

Local Governments Should Actively Participate in the Building of Telecommunications

In addition to state funding and efforts by the posts and telecommunications departments themselves, growth of telecommunications still needs the support and aid of sectors of local governments. That Guangdong, Fujian, and Jiangsu have progressed so rapidly over the past few years cannot be divorced from the energetic support and aid of government departments at each level of the local area. Since the onset

of restructuring and liberalization, many party and government leaders from provinces, municipalities, and autonomous regions throughout China have personally heard reports from post and telecommunication departments, and have strongly supported the hastening of the construction of local posts and telecommunications. Without question, this is a good sign. The building of telecommunications is an extremely complex problem with many factors, especially so since expenses for building communications networks are so great and the problems and complications from office and pipeline construction are even greater, that no one department can solve them. Therefore, posts and telecommunications efforts must certainly include urban planning, must precede in a uniform, progressive manner, and sites for communications offices and pipeline construction must be predetermined, at least in concert with city capital construction, for otherwise money and manpower will be wasted. It is understood that at present in addition to providing support through aspects of funding, as well as through facilitating manpower and materials, many local governments are joining with planning commissions, economic commissions, and construction commissions to collectively discuss development planning for telecommunications to help resolve particular difficulties and problems. This has been done in Beijing, Shanghai, Jiangsu, Shandong, and Liaoning.

However, it should also be pointed out that some local governments are paying inadequate attention to the building of telecommunications, something that does not interest them. Objectively speaking, they are simply embarrassed about it. For reasons having to do with overall structure and fragmentation, funds for telecommunications cannot be used collectively in a uniform manner, which makes it difficult for local governments to take a hand. But there are also many man-made factors, especially where telecommunications construction has failed to be included in local unified planning. It will often be the case that although road construction has been taken care of, items such as cable conduit and gas pipelines have not been considered, until finally there is no choice but to dig up the new road surfaces for construction, which leads to great waste of finances, materials, manpower, and time. There is also the problem of accommodating cable conduit for high-rise buildings, which has proved troublesome for most areas, but which problem has attracted too little attention. No one is exerting any effort to change this situation, which truly gives us cause for concern.

In addition, planning for communications construction should be coordinated. We have been told that at present there are more than 30 national communications networks in China and more than 2,000 regional specialized communication networks, the combined communications capacity of which greatly exceeds that of the public communications network. The rapid growth of specialized communications networks fully reflects the needs for communication in society, and from an overall viewpoint the construction and growth of specialized communications networks have had a positive effect on easing the pressure on public communications

networks. As far as the building of communications for China as a whole is concerned, we need a unified plan to coordinate construction, which would lead to an effective, rational communications network and would avoid the waste of repetitive efforts, interference, and low rates of usage.

Opening New Fields of Endeavor

In addition to what we have discussed above, there is also potential within telecommunications departments themselves that has yet to be tapped. We could at least improve the quality of service and open up new fields of endeavor, for these things increase business volumes, improve business income, and add to the accumulation of effective experiences.

Since 1979, Fujian Province has initiated new items of service, such as international and national direct-dial long distance service, multiple-function local services, wireless paging, subscriber FAX, and TELEX. The postal administration has at the same time begun to implement such new information age services as voice mail, special delivery, and express services. With initiation of these new post and telecommunications services there has been a clear improvement in social results. For example, productivity for the Fujian provincial posts and telecommunications system as figured according to total volume rose, 114 percent over that of 1978, which was higher than the average growth rate of 66.5 percent for the nation as a whole; per capita income throughout the provinces grew by 218 percent times, 25.5 percent higher than the national average.

Naturally, opening up new fields of endeavor requires the preparation of objective factors. This, while departments of posts and telecommunications have so many other things they must or could do for everyday life in modern China. Just look at train stations, docks, and airports, for example. Many cities and local areas inadequately attend to the establishment of postal and communications facilities in public transportation sites, and this is especially true for the train stations and docks of some small to medium cities, which seldom build such facilities. Passengers traveling through who would like to send a telegram or make a long distance call must invariably go to great lengths to do so. In fact, in these areas the departments of the posts and telecommunications and of transportation, and even any relevant parties in these areas, should make overall arrangements, should meet together to resolve problems, and should make things more convenient for the public. It is this writer's opinion that in suitable cities in the future, one should be able to make long distance calls and send telegrams at the main post offices within the city, and that this should not be limited to one area or to a few areas. This will be beneficial to both the income of departments of posts and telecommunications and also to society. In opening the doors of closed enterprises, eliminating the old models of monopolistic operations, and supporting

telecommunications for farmers, the city of Guangzhou deserves our respect. In January 1985, this city supported nine groups of farmers in the Sanyuan neighborhood on its outskirts to establish the first telecommunications operations office in China, in which were set up four domestic long distance booths, two booths in which one can directly dial Hong Kong, and two booths for local calls with a direct line to the city telegraph office. It has been busy since opening, and they have instituted 24-hour service, which has won public praise. Over the last two years, there has been a steady increase in this sort of thing by Guangzhou farmers. There are 13 such farmer-operated communications service centers at present, which are one-half the communications service sites throughout the entire city.

Hong Kong-Guangzhou Fiber-Optic Cable Operational

40100015 Beijing XINHUA in English 1112 GMT 21 Oct 88

[Text] Hong Kong, October 21 (XINHUA)--A 247-km optical fiber cable system linking Hong Kong and Guangzhou in south China was put into operation today, marking a new stage of telecommunications history between the two places.

A two-way video conference was held over the optical fiber link today to mark the opening of the new system.

On both ends of the system were representatives of local governments and posts and telecommunications departments who were sitting about 130 km apart.

The cable system is the first extending out of Hong Kong and believed to be the largest inter-area system in the world, said a spokesman for the Cable and Wireless (HK) Ltd and the Guangdong Posts and Telecommunications Bureau.

It provides digital capability covering voice, data and video or any combination of these transmissions between Hong [Kong--FBIS] and major areas in Guangdong Province including Shenzhen, Dongguan and Huizhou.

The 1.2 million U.S. dollar system has an ultimate capacity of 46,080 voice channels. Initially, 7,680 circuits will be used and these will work in tandem with the current microwave radio circuits to meet the present demand between Hong Kong and Guangdong, the spokesman said.

Optical fiber cable, which transmits signals in digitized light pulses is state-of-the-art telecommunications technology. It is considerably smaller and lighter than copper cable, easier to install and maintain, and has a very large capacity; therefore, very cost-effective as well.

It is also impervious to electromagnetic interference caused by weather conditions. Apart from high-quality voice circuits, the cable can be used for data transmission for facsimile, computer links and even television.

Briefs

Guangdong Telephone Modernization--Guangdong Province will be purchasing a 130,000-switch S-1240 stored program control exchange manufactured by Shanghai Bell Telephone Company. The first phase of the system, which can be fully operational next year, will consist of 70,000 switches; this equipment will be installed in Zengcheng, Shanwei, Doumen, Conghua, Huidong, Yangjiang, Qingyuan, Enping, Hua, and Huiyang Counties, and in other places. [Text] [40080060a Beijing DIANXIN JISHU [TELECOMMUNICATIONS TECHNOLOGY] in Chinese No 10, Oct 88, p 47]

Shanghai Municipality DMW Telephone System--Following upon the opening in April 1987 of the Chuansha County-Shanghai County portion of the southeast Shanghai Municipality digital microwave (DMW) telephone system, two additional legs of the system were opened in June of this year: from Fengxian County to Shanghai County and from Nanhui County to Shanghai County. Customers in these outlying counties [i.e., Chuansha, Fengxian, and Nanhui] can now dial direct to Shanghai County telephone customers. Through an operator, the average customer can also be connected to [any] local telephone customer in the municipality's DMW network. [Text] [40080060b Beijing DIANXIN JISHU [TELECOMMUNICATIONS TECHNOLOGY] in Chinese No 10, Oct 88 p 47]

Tianjin Municipality Telephone System--With the help of a Japanese loan in yen, Tianjin Municipality has completed installation of the first phase (40,000 switches) of the NEAX-61 stored program control (SPC) telephone exchange, which became operational on 23 July 1988. Current plans call for 30,000 of the remaining 40,000 switches taking up the balance of the loan to be operational by the year's end. When all of these lines are installed, the municipality's SPC telephone system will reach 100,000 switches and the entire telephone system in the municipality can break 150,000 switches. [Text] [40080060c Beijing DIANXIN JISHU [TELECOMMUNICATIONS TECHNOLOGY] in Chinese No 10, Oct 88, p 47]

Sichuan's First Fiber-Optic Line--Sichuan Province's first long-distance optical communications cable--a 34 Mb/s long-wavelength single-mode optical cable running from Chengdu to Dujiang Yan--was put into trial operation on 25 July. This 6-core optical cable, with a total length of 64 kilometers, is one of the state's 15 key projects in the Seventh 5-Year Plan. [Text] [40080060d Beijing DIANXIN JISHU [TELECOMMUNICATIONS TECHNOLOGY] in Chinese No 10, Oct 88 p 47]

Nanjing Fiber-Optic Production Sets Mark--It has been learned from the Greater Nanjing Fiber-Optic Communications Exhibition which concluded on 17 October that annual production of fiber-optic communications equipment in the Nanjing area has an output value surpassing 100 million yuan; this field has become a significant branch of Jiangsu Province's high-tech base. During the Sixth 5-Year Plan, the area had 49 scientific achievements in fiber-optic communications which passed technical certification. These achievements, four of which received national awards, are in areas such as television broadcasting, municipal telephone communications, industrial monitoring and control, railroad and power communications, computer networks, and dedicated military systems. Among fiber-optic communications projects completed nationwide, Nanjing has participated in 55 and has laid a total of 396 km of optical cable. In the Seventh 5-Year Plan, over 20 universities, research institutes, and industrial enterprises in Greater Nanjing have been involved in development of fiber-optic communications; digital fiber-optic systems, satellite digital fiber-optic transmission systems, and fiber-optic components have been put into batch production. Also, new breakthroughs have been made in the development of integrated fiber-optic broadband switching services and fiber-optic coherent communications systems; these systems, several performance parameters of which meet the standards of similar foreign equipment, are widely used in TV broadcasting, in the postal system, and by other authorities. Provincial and municipal government authorities have long funded coordinated development efforts; as early as the beginning of 1984, the Nanjing Municipal Government set up an Electronics & Fiber-Optics Office, which pioneered applied fiber-optic technology, including the establishment of a computer local-area-network fiber-optic transmission system linking the various departments in the city government. [Summary] [40080069b Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 42, 2 Nov 88 p 1]

Hybrid 3+ Network Debuts--After almost two years of research, an optical cable-coaxial cable hybrid 3+ network has been developed by Shanghai Engineering University's (SEU) Computer Department. This achievement was technically certified on 24 September at the Shanghai Branch of the Stone Group Company. The [U.S.] 3Com Company's 3+ local area network (LAN), a representative Ethernet LAN product, is the main network used in domestic microcomputer LANs, but this coaxial-cable-based product is not designed for long-range transmission, high resistance to interference, or high security. The costly optical repeater method now used abroad involves two coax-cable transceivers, two coax cables, and two optical repeaters. SEU's low-cost, highly convenient, compatible technique uses two optical terminals (fiber-optic transceivers) and two-core optical cable to replace part of the coax. The optical repeaters comply with the IEEE 802.3 standard; provide for CSMA/CD [carrier sense multiple access with collision detection], Jab, Jam, and other functions; and are completely compatible with Ethernet and 3+Net. The user need not make any modifications (such as hardware and software). Testing has shown that the optical cable can extend over more than two kilometers. Several technical indicators meet or exceed 1980's international standards for similar products. This achievement is now patent pending at the Patent Office. The Shanghai Branch of the Stone Group Company is currently preparing to purchase the technology and is engaged in negotiations to that effect. [Summary] [40080069c Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 43, 9 Nov 88 p 16]

New Optical Cable Developed--China's first independently developed long-distance trunkline skeletal-type [gujia shi 7539 2665 1709] single-mode optical cable, perfected at the Ministry of Posts & Telecommunications' Houma [0186 7456] Cable Plant, passed ministry-level quality acceptance check a few days ago and is now in production. Aiming towards international advanced fiber-optic communications technology, the Houma Cable Plant in November 1987 installed China's first optical cable assembly line capable of manufacturing 1000 km of cable annually. In contract competition with five domestic and foreign companies held in April of this year, this plant easily won out over the others for its high product quality, low prices, and on-time delivery. [Text] [40080067a Beijing ZHONGGUO JIXIE BAO in Chinese 8 Nov 88 p 1]

Agreement with Ericsson--Beginning next year, China will be able to produce top international-quality telephone equipment. The Beijing Wired Telecommunications Equipment Plant recently signed a six-year agreement with Sweden's Ericsson Telephone Ltd. for equipment to annually produce a 100,000-line MD110 digital automatic telephone exchange. The plant is now the third plant in the country to take on manufacture of Ericsson telecommunications equipment and power cable. With this agreement, China will be able to reduce imports of telephone equipment. Ericsson recently signed a [separate] contract with Shanghai for construction of a cellular mobile telephone system. [Summary] [40080067b Beijing ZHONGGUO JIXIE BAO in Chinese 8 Nov 88 p 1]

Wuhan's Longest Fiber-Optic Line--The Hanyang-Hannan optical cable communications construction project--designed by the Wuhan Institute of Posts [& Telecommunications] Science and jointly built by three Ministry of Posts & Telecommunications companies aided by the Wuhan Telecommunications Office and other units--recently began operation. This 37-km-long fiber-optic communications line--the longest such line completed in the Wuhan area--uses all domestically made fiber-optic communications equipment. This line will provide 120 direct circuits between Hanyang and Hannan; ultimate capacity can reach 1920 circuits. [Text] [40080067c Beijing DIANZI SHICHANG [ELECTRONICS MARKET] in Chinese 6 Oct 88 p 1]

DMW-Equipment Production Lines Imported--China and Japan recently signed an agreement in Beijing for the transfer of production-line technology for high-capacity digital microwave (DMW) communications equipment. Japan's NEC will provide the Ministry of Posts & Telecommunications' Beijing Communications Equipment Plant with two production lines--one for 68Mbit[per second] equipment and one for 140Mbit[per second] equipment. Before the end of next year, China will produce its first batch of world-class high-capacity DMW equipment. [Summary] [40080067d Beijing DIANZI SHICHANG [ELECTRONICS MARKET] in Chinese 27 Oct 88 p 1]

Meteorological Computer Telecom Network--Beijing, 15 Nov--A Chinese-language microcomputer meteorological telecommunications network linking the Main Office of the State Meteorological Administration (SMA) [in Beijing] with various weather bureaus--including those in Tibet, Gansu, Hubei, and in other provinces and regions--has passed ministry-level certification. Jointly completed in three years by the SMA Main Office, the Yunnan Province Meteorological Administration, and the Beijing Meteorological Center, this network is now formally operational. Authorities at SMA commented that the network was built with

existing meteorological circuits, complemented with hardware and software specially developed for the purpose of linkup with the subordinate bureaus, and that only some 40,000 yuan were spent on the project. The information transmission rate has been improved--only minutes are required for data from the provincial bureaus to be displayed on the screens at the main office. [Summary] [40080079a Beijing GUANGMING RIBAO [GUANGMING DAILY] in Chinese 16 Nov 88 p 1]

Fiber-Optic Distributed LAN Developed--OBSDNET, the fiber-optic broadband-switching distributed local area network (LAN) developed by the Nanjing Institute of Posts & Telecommunications, was favorably received at the recent [September 1988] National Fiber-Optic Communications Exhibition. This new achievement, the first of its kind in China, is based on Omnet and Ethernet microcomputer LANs; through hardware and software development, expanded data processing and communications functions are provided. In addition to FAX and telephone communications functions, it can handle broadband video communications, fixed-point monitoring, and teleconferencing, and has broad applications in systems such as transaction management, production management, and military command. The institute plans to put this product to practical use in the near future. [Summary] [40080079b Beijing JIS'ANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 44, 16 Nov 88 p 1]

Different Treatments of Nuclear Binding Effect in Deep Inelastic Lepton Nucleus Scattering

40090027a Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 6, Nov 88 pp 786-792

[English abstract of article by Ma Boqiang [7456 0130 1730], et al., of Beijing University]

[Text] The authors show that, when explaining the EMC effect, two models give different results and predictions, although both use certain ways of taking the binding effect into account. The first can explain the bulk of the EMC effect only, whereas the second can explain, in addition to the bulk of the EMC effect, the detailed features of the SLAC data and the discrepancies between the EMC data and the SLAC data. The two models also give different predictions for the ratio $R = \sigma_L/\sigma_T$ in deep inelastic lepton nucleus scattering. It seems that the available data favor the second model.

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Computation Research on Beam Transverse Motion for 35 MeV Beijing Proton Linac

40090027b Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 6, Nov 88 pp 793-798

[English abstract of article by Luo Zihua [5012 4793 5478], et al., of the Institute of High Energy Physics, Chinese Academy of Sciences, Beijing]

[Text] Some problems relating to the beam dynamics computation of transverse motion for the 35 MeV Beijing Proton Linac are discussed. The computation results are used in the beam test of the linac and prove the suitability and reliability of the computation. These computations are useful in guiding the beam test of the linac.

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Calculation of Cross Sections of Complete Fusion, Neutron Evaporation for Heavy System

40090027c Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 6, Nov 88 pp 831-839

[English abstract of article by Zhang Zhen [1728 7201], et al., of the Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou]

[Text] The experimental data of the capture and complete fusion cross section for the ^{35}Cl , $^{40,48}\text{Ca}+^{238}\text{U}$ system are fitted by using the Extrapolation Model. In consideration of the competition between the fission and neutron evaporation, the excitation functions of the capture cross section, complete fusion cross section and neutron evaporation cross section have been calculated for the $\text{Ar}+^{233,235,238}\text{U}$ system.

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Shell Effects in Heavy Ion Collisions for Low Bombardment Energies

40090027d Beijing GAONENG WULI YU HE WULI [HIGH ENERGY PHYSICS AND NUCLEAR PHYSICS] in Chinese Vol 12 No 6, Nov 88 pp 840-847

[English abstract of article by Liu Jianye [0491 1696 2814], et al., of the Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou]

[Text] The variances of the mass distribution and charge distribution, as well as the neutron-proton correlation function for the collision systems of the single closed shell nuclei $^{144}\text{Sm}+^{144}\text{Sm}$ and not closed shell nuclei $^{154}\text{Sm}+^{154}\text{Sm}$, have been calculated using the master equation coupled with the dissipative dynamics equation under inclusive shell corrections. All values are systematical differences between the two collision systems. Good agreement was found between the experimental values and the calculated results. It is shown that the shell effects are important for the variances of mass distribution and charge distribution for low bombardment energies.

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